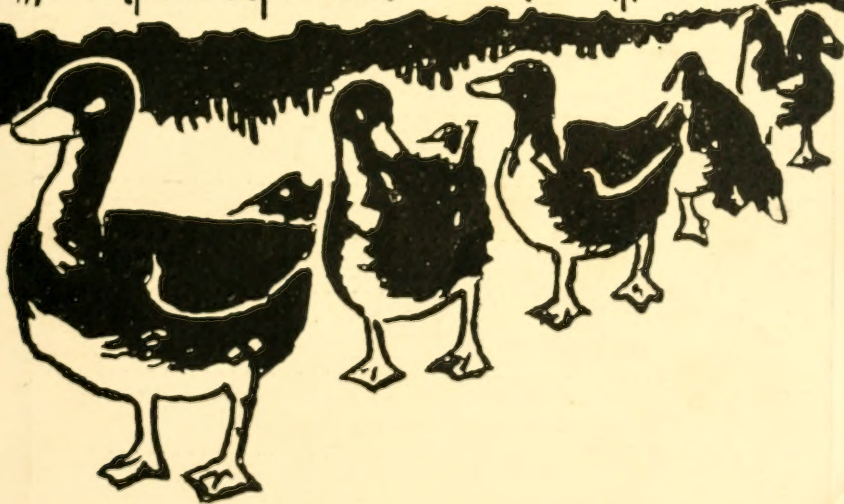


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DUCK CULTURE

SIXTH EDITION
REVISED AND ENLARGED



BY
— JAMES RANKIN —

THE A.D. HOSTERMAN CO., PUBLISHER
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NATURAL
AND
ARTIFICIAL
DUCK CULTURE

By JAMES RANKIN

SOUTH EASTON, MASS.

1914

Price: 75 cents.

SIXTH EDITION. REVISED AND ENLARGED.

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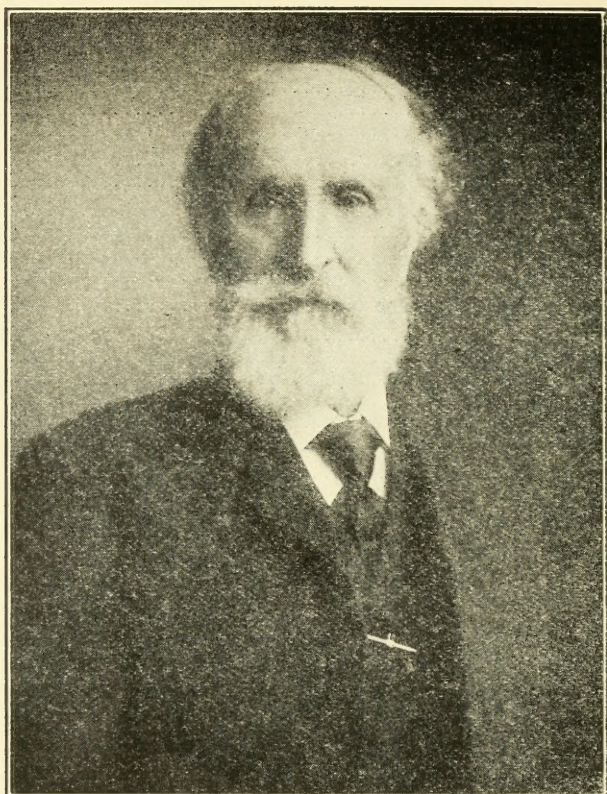
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JAMES RANKIN, The Author

**America's Recognized Leading Authority for a Generation
on Duck Culture.**

INTRODUCTION.

Our original motive in publishing this little book, was one of self-defense, to relieve ourselves, in a measure, of a correspondence which was becoming much too large for the time at our disposal. After reading from fifty to one hundred letters per day, from people, asking all manner of questions concerning the hatching, growing and marketing of ducks, in

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detail, there were not hours enough in the twenty-four to answer them. This book was published to meet these queries and give our patrons our method of growing, supposing it would cover all the points in duck-culture, but it does not as yet answer the ends. The questions still come in far beyond our ability to answer, and as our fifth edition is about exhausted, we now publish a sixth, revised, enlarged and illustrated; also adding a Question Bureau, which will answer many of the questions which have reached us during the past few years concerning the growing, as well as the diseases to which the Pekin duck is subject. Though we were in this business for nearly forty years, and were eminently successful, we do not claim to know all about it; but by persistent effort, careful selection and breeding, succeeded in developing a mammoth strain of Pekin ducks, which, for symmetry, precocity and fecundity, stand unrivalled on this continent.

Many of our customers at that time wrote us that their birds averaged from 150 to 165 eggs per season. We would say that there is no domestic bird under so perfect control, so free from diseases of all kinds, or from insect parasites as the Pekin duck. From the time the little bird is hatched until it is full grown and ready to reproduce its own species, it is under the perfect control of the intelligent operator, who can produce feathers, flesh or bone at will, and even mature the bird and compel it to lay at four-and-a-half months old. There is no bird in existence that will respond to kind treatment, generous care and feed as the Pekin duck. On the other hand, there is no bird more susceptible to improper feed or neglect, and a sad mortality is sure to follow among the little ones, where proper food and system are wanting. It may surprise some one to know that the predisposition to disease may exist in the egg from which the little bird is hatched, or even in the condition of the parent bird which produces the egg. Strong physique in animal life, as in man, are like exotics, requiring the most assiduous care and cultivation, and are the most difficult to transmit.

Defects, like weeds, seem indigenous to the soil and will reproduce with unerring regularity, and will often crop out in all directions, generations after you think you have wiped it all out. So it is one thing to produce an egg from good, strong, vigorous stock during the winter in inclement weather, when all nature is against you, and so poorly fertilized that if it hatches at all, will hatch a chick so enfeebled in construction that no amount of petting or coaxing can induce it to live, but quite another to produce an egg so highly vitalized,

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markets personally and tease the dealers to purchase my birds in order to secure anything like satisfactory prices. Later on, that it will be sure to hatch a healthy young bird, bound to live under all circumstances. But this is not all the danger. The operator, though he may have good eggs, may be neglectful or ignorant, and the health of the young birds seriously injured during the hours of incubation; or he may have a defective machine which under no condition can turn out healthy birds. With healthy, vigorous parent stock, judicious care and food, there is no reason why good hatches of strong, healthy young birds may not be obtained and the same matured with very little loss.

Since the last edition of our *Duck Culture* reached the public, there have been wonderful changes in the duck industry and those changes have all been in favor of the growers' profits. At that time the high price of labor together with its unsatisfactory nature, the ridiculously low price the ducklings commanded during those summer months while poultry lovers were scattered along the seashore or patronizing the mountain hotels in the interior, made it extremely doubtful to the duck grower where his profits came in, but now, all this has been changed and in his favor. I do not mean in the methods of feeding or the extreme care necessary to facilitate the health and growth of the young birds, or of the ingredients composing the food at the different stages of growth but by the use of new and improved machinery, reducing the labor at least one half by the introduction of the gasoline engine, the patent mixer, the pneumatic tank, systematic piping and last but not least the Mammoth Incubator of from five thousand to twenty thousand egg capacity which has not only reduced the expense of incubating the eggs by more than one half but has practically eliminated all danger from fire. The effect of all this enables the grower to nearly double the amount of his product without materially increasing his expense. For instance, many of these large duck plants are feeding from one hundred to three hundred bushels of food per day. Think of man with shovels and a trough, mixing all this with water to the consistency required. Ten minutes with the mixer would supercede many hours of labor with the shovel.

In days of yore, one man was required to do the watering while another did the feeding; now, by simply turning a faucet, fifty pens of ducklings are water instantaneously.

Tramways are arranged so that food can be run the whole length of a 300 ft. building in cold weather and outside on days when the birds are fed out of doors in warm weather.

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In regard to incubating the eggs, where we used forty lamps to our incubators, now, one little heater is as easily cared for as one lamp, not only reducing the labor of incubating to a minimum but diminishing all danger from fire.

In those days, during the summer months, the supply of ducklings would exceed the demand; the market was glutted and the prices sometimes fell to eleven and twelve cents per pound for ducklings. Now, the market is eagerly watched by cold storage men and at the least sign of depression, the surplus stock is absorbed at once so that green ducks readily command twenty cents per pound at all seasons of the year.

Of course, this state of things is highly gratifying to the grower, assuring him immense profits and a permanent business. When interviewing the principal Boston marketmen a short time ago, they all assured me that their sales of green ducklings had more than doubled during the past five years. There are now more than one hundred and fifty thousand ducklings grown each season, within a few miles of Boston and yet the demand is still in excess of the supply. The demand for these birds is also increasing in our large hotels, in private families and is rapidly supplanting the call for capons and roasters; in fact, there is no business on the farm or in any line of agriculture that is so promising or will make such profitable returns for the capital invested as the growing of ducks for the market. It is bound to supercede the chicken business.

I am often asked which is the most profitable—the growing of ducks or chickens. Of course, I have but one answer—ducks. Why?—for two reasons—you can always grow as many pounds on a duckling in ten weeks as you can on a chicken in twenty weeks and as you have animal life to sustain but half as long in growing the duck as in the chick, the pound of duck costs you at least two cents less than that of the chick. Again, you can grow but one crop of chicks in one season, as it requires the whole season to grow roasting chicks or capons but you can easily grow two crops of ducklings on the same plant, thus doubling your profits.

Now, all this may seem very alluring to the amateur or the young beginner, but there is another side to this question—it is not all fun. He will find it far different from spending six hours on a revolving stool in the city and having eighteen hours to himself for rest, sleep, and recreation, for he must spend at least six months of the year from twelve to fifteen hours each day in hard labor with a good deal of thinking in between and if he is at all lazy or averse to using his

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muscles or likes his bed in the morning he had better choose a different occupation.

I have in mind several instances where under the most promising and favorable conditions, men have made complete failures of the business through sheer laziness. A young man called on me a few days ago, saying that he wanted a little information. He had been growing from twelve to fifteen thousand ducklings for the market yearly. He said that his eggs were not hatching very well and that his ducklings were languid in their movements and light colored and that the mortality reached fifteen per cent. He was running two large Mammoth Incubators. Now, there was something wrong, as five per cent is about a normal mortality; the trouble must be in the eggs. I asked him how he fed. He said, "the same as he had fed during the winter and the ducks seemed to do well on it. I said, "do you know that what would be ample for your ducks when in a quiescent state during the winter would not be sufficient for them to produce an egg each day weighing one-fourth pound, an egg so highly vitalized and fertile that it would hatch out a vigorous young bird, bound to live under all circumstances. You must turn in a food that will savour largely of the ingredients of which the egg is composed. In short, you must concentrate your food. Cut out the beet pulp and one-third of the wheat-bran; increase the corn-meal and Red-dog flour a little and the **beef scrap and all animal food, at least one-half.**"

I had the same experience with a young man two years ago who blamed his incubator. He had just bought a large Mammoth. I told him that his eggs were at fault and that he must change his feed. It was astonishing how well his machine hatched after that. Experience of this kind shows us how often success or failure in this business hangs upon things of so trivial a nature as to escape our notice.. A sufficient proof that we must exercise our brains a little as well as our muscle, in the duck business.

Natural and Artificial Duck Culture.

It is only within a few years that the public at large has become awake to the importance of the poultry interests in the country. Formerly it was supposed to be of insignificant proportions compared to the beef and pork product. But recent statistics show that the poultry interests in magnitude not only exceed either of the above, but are vastly on the increase year by year. Yet, strange to say, the supply, enormous as it is, does not keep pace with the demand. As a natural consequence, we are obliged to import millions of dozens of eggs from Europe, and carloads of poultry of all descriptions from Canada. (December 21, 1888, a train of twenty refrigerator cars loaded with dressed poultry, aggregating 200 tons, arrived in Boston from Canada,—\$50,000 worth of dressed poultry at one shipment.) Still the demand goes on. Our large cities, which form the principal market for poultry and eggs, are growing larger every year. The rich men who inhabit them are growing richer and more numerous, and are always ready to pay the poulterer a good round price for a first-class article. Good poultry has not only become an every day necessity to the well-to-do classes, but is a common article of diet at least six months of the year on the workingman's table. It is everywhere recognized by physicians as the best and most palatable, as well as the most wholesome and nutritious, of all our flesh diets.

Duck Culture an Important Industry

Duck culture now assumes a most important part in the poultry business, and yet, until within a few years, people did not suppose that ducks were fit to eat. But now the public appetite is fast becoming educated to the fact that a nice, crispy, roasted duckling of ten weeks old is not only a dish fit for an epicure, but is far ahead of either turkey, chicken or goose. As a natural consequence, the demand for good ducks is rapidly increasing. One of the principal poultry dealers in Boston assured me that his sales of ducks had nearly doubled in five years. Twenty-five years ago, when growing less than 1,500 ducks yearly, I was obliged to visit the city

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with a ranch capacity of nearly 20,000 yearly, I could not fill my orders.

Pond or Lake Not Necessary

The reason is very plain. Formerly people supposed that ducks could not be successfully grown without access to either pond, stream or coast line. As a natural consequence, a large share of the birds sold in the markets were grown on or near the coasts, fed largely on fish, partially fattened, and were anything but a tempting morsel. For years there have been large establishments on the Long Island shores devoted to duck-culture. Large seines and nets were used regularly to secure the fish on which the young birds were fed and fattened. These birds grew to a large size and attained a fine plumage, but, as might be surmised, their flesh was coarse and fishy. Occasionally a person was found who relished these birds, but the majority of people preferred to eat their fish and flesh separately. Now this is all changed.

Duck-culture of today is quite a different thing from the days of yore. Then, the young birds were confided to the tender mercies of the old hen. Now, the business is all done artificially. The artificially-grown, scrap-fed duckling of the interior is a far different bird from his fishy-fed brother of the coast. He has been educated to a complete indifference to water except to satisfy his thirst. Taught to take on flesh and fat instead of feathers, his body is widened out and rounded off, and, when properly denuded of his feathers, is a thing of beauty.

Ducks In Great Demand for Food

This sudden popularity of the duck in our markets, the great demand for them on the tables of our epicures, together with the immense profits realized from growing them, has naturally created quite an interest among poultry-men; so much so that I was constantly flooded with letters filled with inquiries as to which was the best variety to raise, which were the best layers, if they could be hatched in incubators, what kind of buildings were necessary, the amount of profit realized,—in short, wishing me to give them the whole thing in detail, which, were one willing, it would have been completely out of one's power to do. As there seems to be no work published in the country to meet this case and answer these queries,—in pure self-defense, and through earnest persuasion of many friends, I shall, to the best of my ability, through this little treatise, endeavor to answer them, together with many other points which will naturally suggest themselves.

I shall confine myself almost entirely to an exposition of

the artificial method, giving my own experience in the business for thirty years, in detail. In doing this, the most approved buildings will be (both for brooding and breeding) described in full, together with cuts of the egg in different stages of incubation, and the living and dead germ compared, and how to distinguish each, plainly told. Just here let me say that a great deal of skepticism prevailed among people in general and farmers in particular. They did not believe in the success of artificial poultry growing, or, indeed, of growing it in large numbers in any other way. As a proof of their assertions they will tell you that more than three-fourths of the people who attempt the business on a large scale make a complete failure of it. And it is the plain truth. There are few communities in this country, large as it is, but that, at some time in the past, has had a bogus incubator within its limits, or a good one that has been badly managed. The unfortunate experience of these men has spread for miles in all directions. There is but one verdict. The man is never condoned. The system is so denounced that a strong prejudice exists against all incubators, which it is difficult to combat. Every town, too, has had its representative poultry man who has erected extensive buildings with a view to growing poultry on a large scale in the natural way. He, too, has met with disaster. Failure has attended his efforts, and the community is still more embittered against the whole thing, and the emphatic "It can't be done," meets you on every side.

Now, there is a cause for all this. Where is it? In the men. They do not comply with the conditions of success, and failure is the result. We will endeavor to give some of the reasons why: Nearly three-fourths of these people come from the city. Now, city people have unfortunately imbibed the impression that the necessary amount of brains and executive ability required to successfully run a mercantile, manufacturing or broker's business in the city is largely in excess of that required to run a successful poultry or agricultural ranch in the country.

Raising Poultry in the Country

Men who have impoverished themselves by repeated failures in the city come out to retrieve their fortunes by raising poultry in the country. They visit your place and see thousands of young ducklings of all sizes and ages, each one vying with the other as to which will consume the most food. They are completely carried away with the sight. They question you closely in regard to the profit derived from the business, and then openly avow their intention of doing the same thing

themselves. You advise beginning small, and meekly suggest the possibility of failure through inexperience. The incredulous smile that plays over their features informs you that advice is wasted. "Why, haven't I read up all the poultry journals and got the whole thing down fine?"

Others, still, who, from close confinement at sedentary work in the city, are anxious to engage in a business which promises equally to restore their health as well as to provide them a livelihood. These invalids come out with their exhausted energies and dilapidated constitutions to engage in a business which, to insure success, requires a minuteness of detail and intensity of application second to none. They are unequal to the six or eight hours required of them on a revolving stool in the counting-room in the city, but are equal to the fourteen and sixteen hours indispensable to the poultry business in the country. Is it strange that a large proportion of these men fail?

Others, still, come to us wishing to engage in the business, at the same time candidly acknowledging their complete ignorance and inexperience. They frankly state their circumstances. They are poor, with families to support, and are not afraid of work, throwing themselves, as it were, upon one's mercy. They seek a good, healthy and fairly profitable occupation in which they can cultivate the physique and morals of their children away from the temptations of city life. Now you take kindly to such men; readily forfeit any advantages which may accrue to yourself through want of candor on your part, gauge their calibre, and to the best of your ability measure their chances of success, and give them the best advice you can, which advice usually is to begin small,—say with one machine, buildings in proportion, and increase their plant as their experience and judgment dictates.

Raise Ducks and Chicks

But the reader will say: "What has all this to do with duck-culture?" Simply this: It is to give the would-be poultry enthusiast some idea of what he has to contend with before he begins. To convince him that this is no child's play—that the care of young ducks and chicks means early hours and late. The closest confinement and application is required for at least six months of the year, and if he is at all afraid of hard work or of soiling his fingers, he had better stop where he is. The theory that the poultry business furnishes a good occupation for little boys and girls, superannuated old men and invalids, has long since exploded. We advise people to secure a fair share of health before they

begin and then they will be sure to keep it. As an inducement to all, I would say that there is nothing in the way of farm industry or any other legitimate occupation which will at all compare with the profits obtained from poultry when artificially conducted. There are, however, a few notable exceptions in favor of watered railroad stock, bogus mining shares, patent medicines, and the business done by our bank cashiers when guaranteed a safe transit through to Canada. I would advise all contemplating the poultry business to combine the growing of ducks and chicks together, for the reason that more profit can be realized from both than from either alone, because they do not necessarily interfere with each other, and the same buildings and machinery can be utilized for both. The brooding-house should be filled with chicks in November and December, which they will have outgrown by February, when the building will be required for ducklings. The ducklings, strange to say, though two months younger, will be ready for market as soon as the chicks (provided the latter are held for roasters, as they should be) and they will both be in the market in time to command the highest prices. This is what the poulterer should always cater to, and machinery alone will enable him to do it. He who expects to incubate with old hens during the winter will surely get left. But more of this hereafter.

Select A Good Site

The first thing for one to do (if he is not already located), is to select a good site. It should have a gradual slope to the east or south, enough for natural drainage. No matter how poor the land, it will be rich enough before your fowls get through with it. I need not say that in those regions where snow lies upon the ground four or five months of the year, the conditions are not as favorable for the poultry grower as near the coast line, where snow, though a frequent visitor, remains but a few weeks or days at a time. In the one case it means close confinement to the fowls a great part of the winter, with want of exercise and consequent want of action in the digestive organs. The food is not assimilated, the fowls become debilitated, and though they may give a fair share of eggs, these eggs can seldom be depended upon to hatch. It is true, the active poulterer may overcome this in a measure by clearing away the snow for ten or fifteen feet in front of his buildings after each storm, and by a free use of barn chaff and chopped straw induce his fowls to go out on sunny days, but all this increases his

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work and makes the conditions against him. I simply mention these facts, assuming that where a man has his choice of locations, these hints may have their proper weight in the matter.

Advantages with Ducks

The same rule holds good in a measure with breeding ducks, though not in so great a degree. For instance, your hen when closely confined seems to lose her ambition, and spends a large part of her time on the perches, apparently indifferent to all sublunary things. Not so your duck. She is in constant motion, no matter how small her quarters. No meditation for her. Indeed, the days seem too short for her to exercise in, and so she keeps it up through a great part of the night. Her greatest ambition seems to be to distribute the few quarts of water you have given her for drink, evenly all over the pen you have just covered with dry, finely chopped straw, and make it as sloppy as possible, and it is astonishing in how short a space of time she will succeed in doing it. Again, snow and ice are the aversion of the hen.

She cannot be induced to step in either except under pressure of circumstances. Not so your duck. She likes nothing better than to be out in a snow bank during a thaw, and if she can only work it up into the color and consistency of mud it suits her exactly. She does not mind the cold if she can only keep her feet warm. She is clothed with an impenetrable coat of feathers and an equally thick coat of down. She does not take kindly to confinement in a building and will utter her constant protest, and like the average school boy of ten, prefers to suffer from the cold outside to being comfortable in. Therefore, the main point in breeding early ducks and erecting buildings for the same, next to supplying them with the right kind of food, is to keep their feet warm. Cold feet affect the winter laying of the duck the same as a frozen comb affects the hen. It stops the egg production at once.

Locate Near a Railroad.

Your plant should be located on a line of railroad, in direct communication with one or more of our great city markets, and not too far from the station, as you will necessarily be in frequent and close communication with that.

Arrange the Buildings

to secure good room in front, also good drainage, and especially with a view to reducing the labor to a minimum, both

inside and out. Always remember that the labor is the most expensive part of the poultry business. Now is the time for forethought and caution—save all the steps, all the work you can. You will never suffer from want of exercise, if your fowls do. I never knew a case of gout in a man in the poultry business in my life. It is well, also, when arranging a poultry plant, to make provision for future contingencies, so that should one in the course of time and experience wish to increase his plant and the size of his buildings longitudinally he will have plenty of room to do it, by simply moving the end of his building out as far as he wishes and filling in between. I was obliged to do this several times in the course of my experience, and finally built a double brooding house 250 feet long by 16 feet wide.

One important point in erecting poultry buildings is the difficulty in building them.

Warm, Cheap, and Rat-proof

Formerly I built stone foundations on which were placed the buildings, cementing the stone work to the sill carefully inside and out. This proved in the end not only an expensive but a very unsatisfactory arrangement, for cement it as one would the action of the frost would always part the sill from the foundation and admit the cold air from all around just where it should be kept warm. I have since hit upon a plan which has not only met the case but is comparatively inexpensive. Place posts, with one square side to them, about four feet apart, on which place the 2x4 inch sill. Set these posts in the ground so that the tops rise but one inch above the surface, with the flat side exactly horizontal and perpendicular to the inside of the sill. Then sink a hemlock board twelve or fourteen inches wide into the ground inside of the building, and immediately in front of the two-inch sill, until the upper edge is flush with the upper side of the sill, nailing it firmly thereto, filling up inside nearly to a level of the top of the sill. This gives a warm, cheap foundation on which the frost does not act. Hemlock, too, seems to have an affinity for moisture and will last in that condition from eight to ten years, when it can be easily renewed. This arrangement is also comparatively rat-proof, as a hemlock board is a rat's aversion. It does not agree with their teeth. They cannot possibly dig under during the frozen months of the year, and as it affords them no concealment they do not care to, during the warm season.

The Outside Plan of a Breeding and Brooding House with the exception of a little more glass in the latter, should

RANKIN'S DUCK BOOK

be precisely the same both for ducks and ducklings. The internal arrangements can be made to suit. As I shall give a full description with cuts of this building later, I will now merely give the manner in which it should be arranged as a good breeding-house for ducks. This building should be fifteen feet wide and any length required. It should have an uneven double roof, five-foot posts in the rear and four foot in front. About one-quarter of this front should be glass. There should be a walk the entire length of the building three and one-half feet wide. The main body of the building should be divided into pens twenty feet long, by either lath or wire two feet high.

The walk should be separated from the pens by laths three inches apart, to allow the birds to feed and water from the walk. This method simplifies the labor very much, as it enables the operator to load his barrow, travel the whole length of a 200-foot building and feed and water 500 ducks in a few minutes. This arrangement has many advantages besides, as it permits the birds to feed and water readily from the walk without being able to waste either, or mix the contents of food and water-dishes with filth. It also prevents the birds from slopping the straw in the bottom of their pens, or of soiling their white plumage, both of which they are bound to do if possible, and as the duck, especially the Pekin, is a very timid bird, this plan familiarizes her with the appearance of the attendant without bringing her into actual contact with him.

Use Half the Pens for Feeding Purposes

One-half or ten feet of the twenty-foot pens should be utilized for feeding purposes. The lower board of this slat partition should not be more than three inches wide and should rest upon the ground so the birds can readily feed over it. As this ten-foot partition is but two feet high, the attendant can readily step over it to pick up a stray egg occasionally. Six feet of this partition should be portable and secured with a groove or button so it can be easily removed to allow the entrance of a barrow in cleaning out the pens; this should be done when the birds are out, never when they are in.

The remaining ten feet of the pen should be used for nest boxes, which can be fifteen inches square and one foot high. A board four inches wide may be fastened in front to prevent the nest material from being drawn out. This latter may be composed of finely cut hay or chaff. This must be perfectly dry, as the duck while laying will work it all over and cover her eggs carefully, which as they are pure white, become easily



OUR FAMILIAR HOUSE

RANKIN'S DUCK BOOK

soiled and stained; this will necessitate washing unless things are kept dry and clean. This was a vital point with us, as it never did seem as if a filthy egg would hatch as well as a clean one. I always abominated a machine filled with filthy eggs; it actually hurt my feelings to handle them. These nests should be covered closely and the partition above them be correspondingly high, as the birds will often mount upon the boxes. The back of the nest boxes next the walk should be closed with a board hinged below so that the attendant can let it down readily and secure the eggs from the walk.

The Room for Mixing Feed.

Some twelve feet of this breeding-house may be utilized as a cook and mixing room, and must necessarily be a little higher posted than the rest of the building,—say, two feet higher. This cook room, with boiler, is an essential thing in a duck-house. Unlike hens, they do not take kindly to hard food and whole grain. Their digestive organs, in many points, are different from the hens, and they do not assimilate hard food readily. They require more vegetable food, and those vegetables must be cooked,—but more about this hereafter.

Of course, this building should be sweet and clean, and must be well deodorized; for, though ducks do not generate vermin like other fowl, and are not subject to as many diseases, or as readily affected by thermal changes,—in fact, a good driving rainstorm is their delight,—yet they will not thrive when confined in filthy quarters. It engenders a morbid appetite, impairs digestion, and your bird is poor before you know it. This, of course, arrests the egg production at once.

I wish here to impress upon the breeder the absolute necessity of the careful handling and feeding of his birds; and, when necessary, handle very gently, always taking the bird by the neck. This is very essential, because the bones of a well-bred, well-fatted duck seem wholly disproportioned to the size and weight of his body, and we have often seen a wing broken or a leg disjointed by the convulsive efforts of the bird to escape when caught by those members through the carelessness of the attendant.

The timidity of the Pekin is proverbial. You should move quietly among your layers if you would have them thrive, as constant agitation and disquietude will surely debilitate them and reduce their flesh. I have known a pair of heavy exhibition birds to lose a pound per day during their confinement the first four days of exhibition, and to be eight pounds lighter than they were ten days before when started for the show. Their recuperative powers are equally wonderful. I have

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often seen Pekin ducks, after having produced one hundred eggs in nearly as many days, on evincing a desire to sit, and being somewhat reduced in flesh, when shut up in a yard with drakes and well fed, in less than a week commence her regular contribution of an egg per day.

Water Not Needed

The majority of people have the impression that water to bathe in is essential to secure fertility in duck eggs, but it is a great mistake. My ducks never saw water, the year round, except to drink. They were confined in yards 24x100 feet, some forty in each yard, twenty-four feet being the size of the pens inside of the breeding house. They were confined in these yards for nine months, or till August 1, when they were removed in order that the land might be disinfected. This was done by plowing and growing a crop of barley or rye, when the land was ready for the ducks again.

Free Range Unnecessary

I was constantly experimenting to see if there were defects in my system. A few years ago I had thirty breeding-yards devoted to ducks. I wished to ascertain the difference in egg production and percentage of fertility between ducks yarded close and those with free range, the feed and other conditions being the same. One lot of fifty ducks were allowed the range of a five-acre lot, in addition to their own yard. They ranged in common with our cows, there being plenty of grass. Another lot of seventy-five were allowed the range of the whole premises, with the same feed and care as the eight yards confined. The latter were liberally supplied with all the green and vegetable food needed. The egg production and the fertility of each were carefully noted. I was much surprised to find that the difference was very little, and that, in favor of the birds confined.

The Mode of Feeding

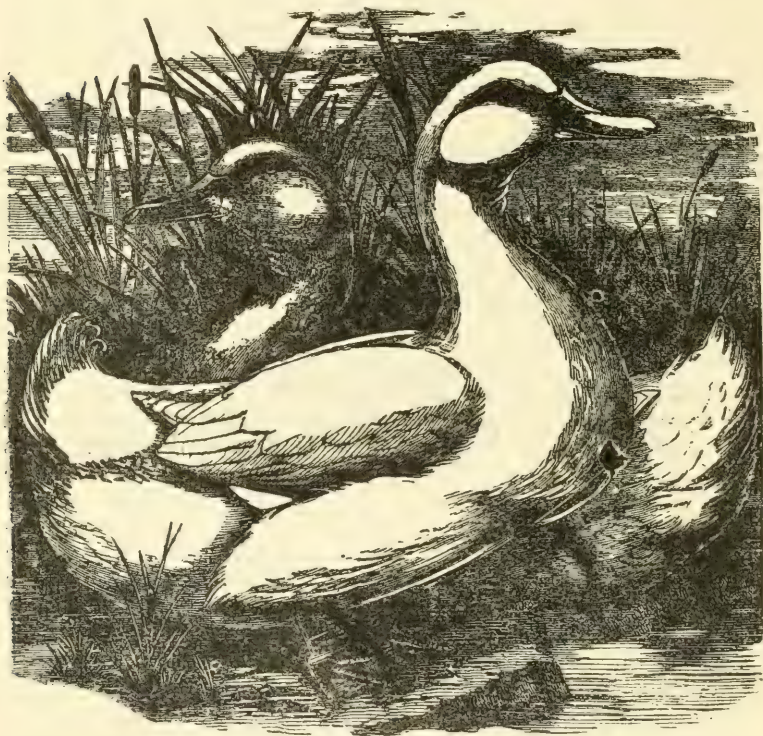
differs with the season of the year. During the autumn and early winter months feed twice each day about equal quantities of cornmeal, wheat-bran, and boiled turnips and potatoes, with about ten per cent. of ground beef scrap thrown in. At noon, give a small amount of dry food, composed of equal quantities of cracked corn, oats, and wheat. When the birds commence laying, as they will about January 1st, gradually increase the quantity of meal and animal food, proportionally decreasing the amount of bran.

The Pekin Duck

is my favorite. I experimented carefully during thirty years

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with all the larger breeds, crossing them in every conceivable way to obtain the best results, and was perfectly satisfied with the Pekins. I was finally through experimenting, and as I grew nearly 20,000 ducklings yearly, could hardly afford to guess at it, as one cent per bird made a difference of over



PEKIN DUCKS

\$200 in my receipts,—one cent per pound, a difference of over \$1,200. It is readily seen that I could only afford to use the bird that would grow the greatest number of pounds of flesh in the shortest space of time. Nor is this all. It must be the bird that will give the first eggs of the season, as this will enable you to get your birds on the market when they will command the highest price, as there is more clear profit from one early bird than from three later ones. This will be the more readily understood when it is known that the maximum price paid for early birds is thirty cents per pound in Boston and New York, the minimum price for late ones

eighteen cents, the cost of production being the same for both.

The Pekin Combines the Best Points

The Pekin is the only bird that will cover all these points. It has two slight defects,—its extreme timidity and its heavy, coarse voice, which it does not scruple to use when congregated in large numbers. The former can be easily overcome by careful handling. But to off-set these defects the Pekin will not only produce the first eggs of the season, but by far the greatest number of any of the breeds, with one exception, the Indian Runner. They mature earlier, are more hardy and domestic in their habits, never wandering far, and always returning to the coops at night. They are not mischievous, and require less water than either of the other breeds.

My birds were for generations bred in dry yards, with simply water to drink, and all desire for it for other purposes seemed to have been bred out of them. When allowed their freedom in the fall, the flocks never visited the brook, fifteen or twenty rods distant, and when driven there occasionally for the purpose of purifying their feathers, got out again just as soon as possible. Indeed, after a water bath their feathers clung to their bodies, and they presented the same bedraggled appearance that the old hen did many years ago after one had immersed her in a water-barrel to cure her propensity for sitting.

A wealthy New Yorker ordered a dozen of my best ducks. In a few weeks he wrote that he wished to return them, as they did not answer his purpose; "for," said he, "I have an artificial lake on my lawn, near my piazza, and I wanted these ducks to disport in the water for the pleasure of my wife and children, and they will not go in the water at all unless I drive them in with a whip, and I have to stand guard over them all the time, as they get out the moment my back is turned." I wrote him in return that had I known he wanted the ducks for their aquatic performances I should have recommended the common puddle duck, when he would have had as much trouble to get them out of the water as he had to get the Pekins in.

Feathers are Pure White

Another advantage of the Pekin over the other breeds is their pure white, elastic feathers which are largely mixed with down. These feathers readily command from forty to fifty cents per pound, and as the reader can see, are no mean source of income, especially when the birds are grown in

RANKIN'S DUCK BOOK

large numbers. These birds, as their name indicates, originated in China. They are large, beautiful birds, of a proud, erect carriage, with pure white plumage outside. The inside feathers are slightly cream colored. The neck is long and gracefully curved; the head long and finely shaped, with a full bright eye. The legs and beak are of a very dark orange, and form a fine contrast to the pure white feathers. The minimum weight of our birds when matured was about fourteen pounds per pair, while the very heaviest would tip the scales at twenty-two pounds. My first experience with ducks commenced more than fifty years ago. We used the common puddle ducks and grew them for the city market. The ducks were very small and so were the profits. They were fed but little and allowed full range, consequently the home ties were not strong.

Those ducks followed the little brook in the pasture through swamps and marshes for half a mile in either direction, wholly regardless of farm limits. If we expected any eggs from those ducks they should have been safely housed at night. This task devolved upon the boys. Now our paternal head, though a kind and indulgent parent (unfortunately for us), had the impression that boys were made to work, and work we did. Now, what boy of ten or twelve years had not rather chase ducks through the mud in the swamp than to wield the hoe among the weeds in the corn field? It was our recreation, our chief solace and delight those long, hot summer days—the anticipation of that duck hunt in the evening. I think my extraordinary love for the duck hailed from this date. Later on we used a cross between a Rouen and Cayuga. This cross made a much larger and better market bird. The flesh was better flavored. They produced more eggs and began earlier in the spring, consequently prices and profits slightly improved.

These birds did not stray far, but were as fond of mud and water as their little predecessors. It was a pleasing and comical sight to see three or four hundred of these ducklings of all ages, when first let out in the morning, run down the hill in their eager haste to reach the swamp, a part of them right side up, then rolling over and over on their broadsides; others still reversing themselves end for end down the steep incline, apparently a matter of supreme indifference how, so long as they reached the mud first.

These ducklings always returned at night with their numbers more or less depleted, as they were the legitimate prey of skunks, minks, weasels and mud turtles; and if we reached the summer's end with sixty per cent. of the origi-

nal number we were well satisfied. All this has been changed. We have learned a number of points on duck culture since then. First, that all losses by vermin can be easily avoided by yarding your little birds at home and keeping them under your own eye. Second, that mud and water externally applied are not essential to their growth and well-being, and that in fact they will thrive better without.

Ready For Market Three Months Earlier

Third, that it is not necessary to keep your birds till they are six months old in the fall and then put them on the market when it is sure to be glutted, but much better to market them at ten weeks, when they are nearly as heavy, and you are sure to get more than double the price, as well as save three or four months extra feed. There are many other points connected with this thing which the novice must ponder carefully before he begins, as a slight mistake in the beginning often means a great loss in the end. As pioneers in the business we were for many years carefully experimenting with the different breeds, different treatment and variety of food. We met with many failures, suffered some loss, but with a gradual improvement through it all, which was very encouraging to us, and though we did not claim perfection, yet we reaped a rich harvest compared to which, our former losses were simply insignificant. It was a a source of gratification to know that success at last crowned our efforts.

When we look back forty years—when year after year chronicled failure and our best efforts met with loss—when we were the butt, ridicule, and laughing stock of the whole community; when we were assured again and again that we were fighting against nature and never could succeed, and repeated failures only seemed to confirm that assertion,—and compare it with later years when we grew our birds by the thousands, regulated the growth, controlled the mortality, and grew flesh or feathers at will; shortened the precocity, increased fecundity, and even educated the birds to an aversion for water, which was formerly their home; we completely reversed the order of things and taught our birds to reproduce at a season of the year when all nature is against them, we could safely feel the victory was won. We hope that our readers will not only benefit by the experience we shall present, but that many of them will be able to take this and carry it on where, according to the natural course of things, we shall be obliged to leave it. We are no longer young, the infirmities and decrepitude of age are slowly creeping upon

RANKIN'S DUCK BOOK

us and admonish us that our days of research are nearly over, and we find that our life is all too short. But there is a satisfaction in knowing that others will take this thing up where we left off and carry it on to the end.

The Superiority of Artificial Poultry Growing

We predict a great future for artificial poultry growing. It is yet in its infancy. The time will come when it will gradually supersede many of the regular farm crops on the sterile soil of New England, when every farmer will have his proper complement of poultry appliances, and when you can prove to the average farmer that the capital necessary to run a poultry plant (which will with less labor insure him a greater income than that from his whole farm) is less than one-fourth of that required for any other farm investment. You will begin to see him scratch his head to evolve ideas. The beginner in starting, should recollect that this is a business of detail and that small things must be taken into account. It is not only a very essential thing to choose the best breeding stock that can be had, but, all other conditions being the same, to select the color of their feathers.

We have always had a predilection in favor of white birds, for the feathers (which are no small item in ducks) command nearly double the price of colored ones, and are always more salable. Again, we must cater for the market with young birds, and every one knows that young birds are more or less addicted to pinfeathers, many of which it is very difficult to remove, as they have secured a lodgment just under the skin, but have not found their way through. Now a dark pinfeather is a blot upon the fair surface of a fine chicken or duck, and the thrifty housewife in selecting her dinner will always leave the pins behind. She does not like a variety of colors in her duckling, if she does in her dress. The dealer, aware of this peculiarity of the ladies (who, by the way, form a large share of his customers) will, if he buys at all, cut you on the price.

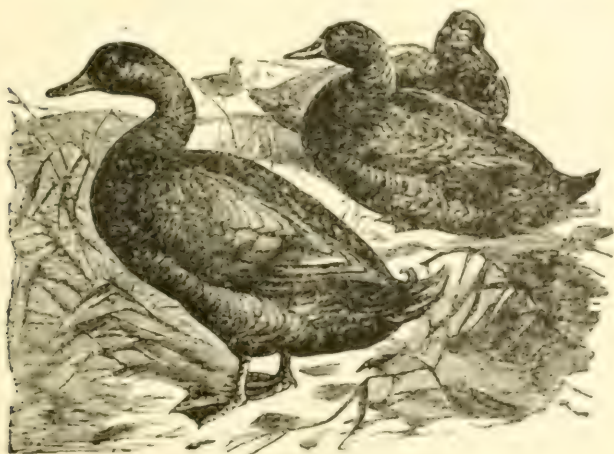
Unfortunately we started in with dark birds, but it did not matter at that time, as the Pekin had not been imported, and there were very few Aylesburys in the country. We were surrounded by vermin of all kinds. Our young birds disappeared mysteriously, and in such large numbers that we were nearly discouraged. Hawks do not trouble ducks, but rats, weasels and minks developed such a fondness for them as to completely atone for any neglect on their part. We made a free use of steel traps, guns, and phosphoretic poison. The battle raged for two years; at the end of that time I think it

would be difficult to find one of the above-mentioned vermin one-fourth of a mile from the place. It was a great relief; our ducklings could range at will, even be left out during the night, and still the full complement appear at the dough-troughs in the morning.

Do Not Have Neighbors Too Near

Another source of discomfort was our neighbors' cats. Now, we are eminently social in our disposition, and enjoy our neighbors' company very much. We like to spend a social evening with them and have them do the same by us. But not so their cats. We never interchanged civilities with them, their visits were too ill timed and frequent. Our ducklings were carried off in large numbers, and in pure self-defense we shot the cats.

Of course, this made trouble in our neighbors' families, especially the female portion, by whom it was promptly resented. The principle of "touch my dog, touch me," was illustrated here in all its force. No amount of provocation ever justified us in their eyes in killing their cats. With pater familias it was different. His affections were not engaged. He recognized the necessity of the thing, laughed it off, and said it was all right. Now, cats breed fast and are very prolific, and our neighbors were plenty, and we are unwilling to



CAYUGA DUCKS

state the amount of our losses from those sources, for fear our veracity would be doubted. We endured this sort of annoyance for some twelve years, but made up our minds that if

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we ever selected another poultry ranch we would locate our neighbors at a distance. We did so, and afterward had no trouble from this source.

We found that the Cayuga duck was a more precocious bird than the Rouen, and were better layers. The eggs were more fertile. They were also much hardier, and, as a consequence, there was less mortality among the young. But they were rather small in size, dressing only seven to nine pounds per pair. The Rouens were nearly four pounds heavier, but had their disadvantages. They were not so productive in eggs, and those did not give us the same percentage of hatch, while the mortality among the little ones was much greater. We do not like to condemn any variety of birds on one trial, as we may be unfortunate in our selection of a strain, but our subsequent experience with these birds fully confirms the above; and though they are a large, attractive bird, we do not consider them as hardy as either Pekin, Aylesbury or Cayuga.

We conceived the plan of crossing this bird with the Cayuga, with a view of increasing the size, not knowing whether the good or the negative qualities of the two birds would prevail. We were very much pleased with the results of this cross, as it gave us all the good qualities of the Cayuga with the largely increased size of the Rouen. It gave us also a good table bird, the flesh of which was far better flavored than that of the puddle duck. We made the duck business then supplementary to that of growing chickens. Our chicks were hatched out early in the winter in order to secure the high prices. Our ducks during the spring and summer were not marketed until fall. We did not expect those ducks to lay till the first of April, and they did not disappoint us. If anyone had told us that young ducks could be made to lay at four or five months old, and that we could have our young broods out by the thousands at that time, we should have called him insane. We then gave our ducklings free range, and, as a consequence, lost large numbers of them from eating injurious insects, which, in their haste, they did not stop to kill, and paid the penalty with their lives.

Now, the genuine duckling is proverbially stupid. He has an immense faculty for getting himself into trouble, without the first idea as to how he shall get out. As, for instance, we had taken up some old fence-posts one day, and carelessly left the holes (some two feet deep) unfilled. When feeding time came at night we missed many of our little ducklings, and at the same time, heard a great squeaking, which we could

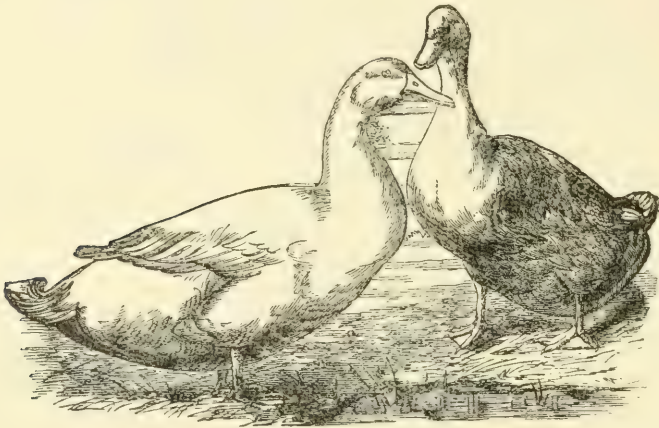
not locate. We finally traced it to the post-holes, which we found-nearly full of young ducklings; not much the worse for the adventure. When we look back at the difficulties with which we had to contend, and the losses we sustained in consequence, I often wonder that we were not discouraged. It was blunder after blunder, repeated always with the same results. We had very little idea of the systematic care and regular food required to insure against loss and enable the young birds to attain a weight in a few weeks which we supposed required almost as many months. We still had the impression that water was essential to the welfare of the birds, both old and young, and that eggs would not be fertile unless copulation took place in the water. So we built a tank for use during the dry season of the year (which held about a hog's-head), and cemented it thoroughly.

This tank we laboriously filled with water for the birds to sport in, but it did not work, as it soon became so offensive that we were obliged to renew it at least every three days, so that we soon became tired of it, and once more allowed the ducks the liberty of the swamp. We never obtained more than half of the number of eggs that we got later on from our Pekins. About this time the Aylesbury duck came under our notice, and we procured a number of them at once, as they came highly recommended, but they did not meet our expectations. They were a very pretty bird to look at, and their feathers were more valuable, but there the advantage ended, for the strain we obtained was a trifle smaller than the mongrels we had been breeding,—rather more delicate to rear, and, worse than all, we found it almost impossible to pick them. In all our experience before or since we have never seen anything to equal those birds. The tenacity of those feathers was exasperating. Every one was bound to retain its complement of flesh. Of course the birds were so disfigured that the most of them were retained for family use. It was no use to think of scalding them,—that would not only seriously injure the feathers, but would completely spoil the birds for Boston market, as scalded birds are rejected at once and classed with cheap Western fowl.

While going the rounds of Boston market one pleasant June day, shortly after our experience with the Aylesburys, we noticed some fine young birds nicely dressed, that had evidently snow-white plumage. As this was before the advent of iced poultry, we supposed the birds had come from the regions of the far South, and our curiosity was excited. We interviewed the dealer and were surprised to learn that the birds were grown to the north of us, and that they were the

RANKIN'S DUCK BOOK

Pekin ducks we had heard of for a year or two, but had taken no stock in. Yet here they were in the market, while ours were toddling about at home less than half grown. Here was a revelation. We procured some eggs of this party, at once, and in due time hatched out sixty lively young ducklings. They were tended with the utmost care and not one was lost. We were very much interested in these little fellows, they were so hardy, and you could fairly see them grow. It occurred



AYLESBURY DUCKS

to me at this time to try and experiment with these ducklings, keep a correct account of all food consumed by them, and ascertain what they cost per pound when ready for market. The average weight was taken from the rejected drakes which we did not need for breeding purposes, and which were culled out and sent to market at ten weeks old. We were very much surprised to find the cost to us (exclusive of the cost of eggs) was about $4\frac{3}{4}$ cents per pound. We could hardly credit our own eyes. The calculation was made again and again with the same result. The same calculation was made a year later on two yards of some three hundred ducklings with a result obtained, when ready for market, of $5\frac{1}{4}$ cents per pound, including cost of eggs.

As I had long since left the paternal abode, and for years had ceased to superintend the establishments of others, and as the following experience will be entirely my own, I shall hereafter use the personal "I." It is needless to say that the figures arrived at from the calculations made of those ducks were

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startling. What! can I grow ducks in three months as cheaply as I can grow pork in a year, or beef in two years, and then get six times as much per pound for it after it is grown? Yes, if figures tell the truth. Can I afford longer to grow large crops of fruit and vegetables, working early and late, risking frosts and drouths, making a bare livelihood, when with one-tenth part of the labor and capital involved I can grow a crop which drouths and frosts do not injure, and make five times as much? No! I have not had a hog on my farm since I kept a Kemp's spreader to work over the manure, and simply grow fruit and vegetables enough for feathered thieves and home consumption. Another question arose: What shall I do with my cows? some sixteen or eighteen in number, bull, young stock, etc.

My Farm

Now, I had become somewhat proud of my farm, as what man does not who had quadrupled its increase within ten years? I was cutting yearly some two hundred tons of hay on less than half that number of acres, and I knew that if I sold my cows I should, in some way, be obliged to get rid of my hay and that would mean disaster to the farm. There might be no decrease in acres, but there would be a sad diminution in the tons of hay. The result was, I kept cows for my own use. Built two new barns, each one hundred feet long, the basements of which were utilized for box stalls, accommodating sixty boarding horses. These converted my hay and grain (for which I received the market price) into manure. This was all I expected and all I got.

Some time ago a gentleman from New York caught me hoeing in my onion patch. He expressed his astonishment at the size of the onions. Said he: "Your land seems well adapted to this crop." "Yes, I have some twenty or thirty acres that are level, the soil is easily worked and friable, not troubled much with maggot, and, if properly handled, is about sure of a crop." "Why don't you put it all into onions?" "I cannot afford to." "Why," said he, "if our New York farmers had that land within twenty or thirty miles of New York city it would be worth \$1,000 an acre, and they would make it pay twenty-five per cent. of that, too, every year." "Possibly they could, but with one-tenth of the labor and capital employed I can raise ducks enough on one acre to buy all the onions I can raise on ten. If I am going to increase my capital and labor in any direction I should put it into ducks, not onions." He acknowledged that perhaps I was

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right, but at the same time thought it was poor economy to grow nothing but hay on such land as that.

The Muscovy Duck

The Muscovy duck as its name implies is a denizen of the Mediterranean and is a beautiful bird, quiet and inoffensive in its habits, but cannot compare with the Pekin either in fecundity or in market value. It cannot be induced to lay so early in the season as the Pekin, thus forfeiting the high spring prices. The eggs require about the same time to incubate as the goose egg (five weeks) and they do not hatch well in an incubator. It is some three weeks longer in maturing than the Pekin and does not command as high a price in the market by two cents per pound. I asked a prominent Boston market man the reason for it. He said that the flesh was coarser than that of the Pekin while the disparity in the size of the sexes made them very unpopular, for instance, while the drake will dress from eight to ten pounds the duck will rate but four or five pounds. Said he, "I want none of them." There are two varieties of this bird, white and colored.

The Indian Runner Duck

This bird is of recent introduction, and while it can never be a first-class market bird on account of its small size and dark pins, it has many good points. Its fecundity is wonderful. There is, perhaps, no bird that will excel it as an egg producer for market. Its patrons are enthusiastic in its praise and claim an average yield of one hundred and seventy-five to two hundred eggs per year from each of their birds, but their small size, four to four and a half pounds, together with their dark pins, militates against their value as a market bird. I have always emphasized the point that size as well as fecundity is a necessary adjunct to a profitable market bird. It is no more trouble or risk to grow a large bird than a small one, while the market returns are often double. The large bird will always command at least two or three cents per pound more than a small one, as well as a more ready sale.

There are four different strains or varieties of this bird, the White, Fawn, Particolored and Dark Penciled, all equally prolific. The patrons of the Cumberland strain of Runners claim a wonderful record for their birds of two hundred large, pure white eggs per bird each year, two of these eggs being equal in weight to three hen eggs with a quality even better than those of the hen.

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These men are so enthusiastic over these birds, they claim that they will eventually revolutionize the egg business in the whole country, for three reasons—first, that two ducks produce more eggs each season than three of the best hens; second, that the eggs being much larger, fully equal in quality, will command a higher price than those of the hen and third, the ducks can be produced much cheaper by the grower and of course at a greater profit to himself.

There is a wonderful call for these birds and if it continues they may sooner or later supercede the hen in the egg business. There is no question but what the demand for duck eggs has rapidly increased during the past few years. Twenty-five years ago the majority of the public did no consider the egg of the duck fit for food. The most of the birds were grown near the salt water, on the shore, often fed on fish and the eggs naturally savored of a saline and fishy nature and was a wholly different thing from the egg produced from a grain fed bird of the interior. Personally, I prefer a duck egg on my own table. The Indian Runner is a precocious bird and can be reckoned on as an egg producer at five months old.

The Dusky or Common Black Duck

This bird is a denizen of all our New England states. It is easily domesticated but on account of the paucity and small size of its eggs can never be a success. The bird is small in size, though prized by many for the delicacy of its flesh. It is in great demand by our sportsmen as a decoy and as such, commands a good price. One of my neighbors had been growing fifteen or twenty of these birds each season. They formed the habit of crossing the pond during the night and inspecting my garden, making bad work, especially during strawberry time, getting more than their share of the fruit. I naturally remonstrated with him and he finally got rid of them.

Wood Duck and Chinese Mandarin

Our little Wood duck and the Chinese Mandarin have been domesticated simply for pets on account of their beauty. They are the most beautiful of all the duck family. Their brilliant plumage is wonderful, closely rivalling the bird of Paradise. They are easily domesticated but are very delicate and are about the size of the common Teal.

In the constant efforts of the breeders to reduce the size, they reduced the vitality also. This seems to be the case always, in reducing the size of the bird or animal the whole system is debilitated. In increasing the size the case is re-

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versed and this is natural. In breeding down, the smallest are naturally selected as breeders and in breeding up, the largest and most vigorous are selected.

Mallard Duck

Our best ornithologists have long conceded the point that all of our large breeds of ducks are descended from the wild Mallard, from the fact that specimens have often been found among them, white in color, even particolored, with all the Mallard characteristics and that the hybrids are all fertile. The Mallard is a denizen of the northern regions of the entire Globe from Labrador on our continent to Siberia in Europe and Asia. It is a beautiful bird and as a progenitor of our large breeds of ducks is a universal success.

I was very much pleased with the Pekin ducks. They not only layed some weeks earlier than any other breed I had ever kept, but were precocious, maturing earlier than either of the other breeds, excepting the Cayugas, there being but little difference between the latter and the Pekins, but the Pekins laying some weeks sooner, it gave us control of the early spring markets, which are by far the most profitable of the year.

Disinfecting

My neighbors had become much interested in the business and often visited me, and were not backward in giving their opinions. They predicted failure for me, giving as reasons that the market would soon be glutted with so much of that kind of stuff, for poultry never could be as good grown in that unnatural way, and that if I kept on growing those ducks in the same yard, year after year, the land would eventually get poisoned, and then disease would clean me out.

But I had thought this thing all over before laying out my yards. I knew that reversing land and cropping it would disinfect it, so a crop of ducks is always followed by a crop of something else; and thus I succeeded each season in getting two crops of ducks and two crops of either rye, barley, or oats, so that the land was not poisoned, and was still growing its complement of large, fat ducks every year, and as I had set it to plum trees, it was beginning to yield fine, luscious plums. Neither was the market glutted, as the demand was far in excess of the supply. The way of growing did not seem to be any objection, as the marketmen were willing to pay me, at least, two to four cents per pound more than they could possibly get for those grown in the natural way.

Perhaps a word here would not be amiss regarding the merits of artificially and naturally-grown poultry for fancy

and market purposes. This is a vital question, and it is as well for the public to fully understand this thing now, as well as its origin. There is many a person who has been thoroughly convinced of the great advantages and the economy of the artificial over the natural way of doing it, and who would gladly have started in the business, but was deterred by the prevailing opinion that artificially-grown birds were always deficient in plumage, and could never win at a show, and that the flesh was inferior for table use and could not find a ready sale. It is as well to explode this thing now, and expose its utter fallacy. There is not a shadow of doubt but that much poor poultry has been put upon the market by people who have attempted its culture in the artificial way by growing hundreds of ducks and chicks in the same limited space that they formerly used for a dozen with an old hen.

These, of course, could not be otherwise than poor and the mortality great. Another reason: the fancy business in poultry is fast being overdone. The best breeds are now scattered far and wide over the entire country. There is not the demand for them that there has been, because good birds can be obtained nearer home. Many of our old and well-known fanciers are making frantic but vain efforts to keep their business up to its former standard. They have suffered considerably from competition with artificially-grown birds, and they roundly assert that it is an unnatural method, that the conditions are not right, that it affects the growth and plumage of the bird in such a manner as to preclude its ever taking a first-class premium at our shows.

Now if they can convince the public that naturally grown birds can capture premiums, and they grow all their birds in the natural way, it is easy to see how their trade would be increased.

Now, I never could see how the old hen could impart vigor to her chicks by imparting lice, or how the increased contributions of filth from the old hen, united to that from the chicks, could ever make the conditions more favorable than that from the chicks alone. It can no longer be denied that the artificially-grown fowls are fast coming to the front,—a place which they already occupy in the market. Many of the largest and most successful breeders in the country, who are winning prizes at the shows, grow their birds artificially. Our own Pekin ducks had, for many generations, been hatched and grown artificially, and for size, symmetry, and beauty of plumage they stood unrivaled in North America. They have

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won first from Canada to the Gulf, and have never been defeated. Three times during the last 15 years we were obliged to enlarge market boxes to accommodate the increased size of our birds; and yet we had bred only from our own stock. A number of times I procured winning birds at the Pennsylvania and Western State Fairs, with a view to a change of blood, only to cast the birds aside on their arrival here, as I could not breed from them without deteriorating my flock in size. I thought if this was the result of artificial growing and of in-breeding, I should keep right on.

In-Breeding

I always selected the very choicest and best from the many I raised for breeding stock, and the result was a gradual increase of size. I have seen many persons who, from a mistaken idea of introducing new blood, have reduced both the size and quality of their stock. Let it be here understood that a man who keeps but one drake and a few ducks is breeding-in fast. But the one who keeps a thousand in different yards can breed many years with impunity, because the intermingling of blood is exactly in inverse ratio to the numbers kept. I repeatedly heard prominent marketmen in New York and Boston say that my artificially-grown poultry, both in chicks and ducks, were the best that they ever handled.

I was then breeding Pekins exclusively, and found the business while growing them was far more profitable than ever before, and accordingly increased my incubating and brooding capacity, and instead of growing 1,500 to 2,000 ducklings, grew from 10,000 to 20,000. This was done during the early spring and summer, the machines and brooders being used for early chicks during the winter. I had observed this, during my experience with chicks, that crossing with the best breeds always made better layers and better market birds than either of the breeds from which they originated; also, that the first cross was always the best, and that continued breeding from crosses is sure to deteriorate both in size and quality.

Crossing

I conceived the idea of procuring some of the best stock possible of Rouens, Aylesburys, Cayugas, and crossing them on the Pekins, with the object of increasing the size and precocity. I experimented first with Cayugas, and crossed both ways, using both Pekin and Cayuga drakes, and, in order to test the experiment fairly, the mongrel eggs were hatched in the same machine, the young birds grown in the same yards, subjected to the same care and feed, with the Pekins. The

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Cayuga cross was very satisfactory, with two exceptions. They were fine, plump birds, took on fat readily, and matured as early as the Pekins, while the mortality was not more than one per cent. on either, but we found that the skin was dark, the dark pins, when there were any, showing very plainly beneath.

These birds were sent to market in the same boxes with the Pekins. Our dealers to whom we shipped allowed us the same price for them as for the Pekins, as there were but few of them, but had they all been of that color would have been obliged to cut them two cents per pound on the price. This was enough for me, especially as I found that the feathers commanded but little more than half the price of the pure white feathers of the Pekins.

The experiment, though conducted in the same manner, with the Rouens, was somewhat different in result. There was a great loss from those mongrels. They evidently inherited the same weak constitutions of the Rouens. They had not the vitality of the Pekins, while they required at least three weeks longer to mature. This latter alone was sufficient to condemn them for all market purposes, especially when subjected to the same discount on dark pins and feathers as the Cayugas. This was sufficient to discard both breeds for my use as market birds.

Aylesburys

But I expected great things from the Aylesburys. I procured the best ducks to be had in the country, while I used imported drakes from the best prize-winners in England, and I have never yet seen those drakes equaled in size; and I was unusually careful in this experiment, because I knew that the English breeders claimed for their birds a superiority in all the points essential for a good market bird, namely, delicacy and flavor of flesh, size, precocity, and greater egg production,—laying special stress on their hardiness and vitality. I bred those birds clear and crossed them, carefully noting the result. Our first batch of Pekins and those crosses numbered about 300, nearly equally divided. These were mixed and confined in two yards.

For the first two weeks there was no perceptible difference, when gradually the young Pekins began to outgrow the crosses, the difference increasing with age. The former were very even in size, the latter irregular, while the mortality was as six to one in favor of the Pekins. When we began to kill those birds the Pekins were all in the market at the end of eleven weeks, while the crosses remained in the yards fully

one week behind. The weight was in favor of the Pekins about one pound per pair.

The same difficulty existed as in former years—the tenacity of the feathers. The pickers grumbled, while the birds were more or less disfigured. I notified the dealers of the breeds of those ducks, and of the claim made by the English breeders, and wished them to ascertain if possible if there was any difference in favor of the Aylesburys. They said their customers found no preference, for themselves they preferred the Pekins on account of the larger size and finer appearance of the dressed birds. But I found it made a vast deal more difference than that to me. One pound per pair on 2,000 pairs of ducklings, at an average price of twenty-five cents per pound, made a difference of more than \$500 to me; especially the extra ten days required to mature the Aylesburys cost more than the feed for extra pound of flesh grown upon the Pekins.

Precocity

There is one point which I wish to impress, which is too often overlooked, and yet is of the most vital importance to the poultry grower, and that is the early maturity of his market birds. I often hear growers say that as there is very little change in the poultry market during nine months of the year, and as they do not contend for the early spring prices anyway, if their birds are three or four weeks longer in maturing it does not matter. Does it not? I have always contended that it requires just so much to sustain life in either bird or animal, and the profit consists in what we can get them to consume and digest over and above that; and if the time required to do this is protracted longer than is necessary, it is done at the expense of the grower.

If it takes ten weeks to grow five pounds of flesh on one bird and fourteen weeks on another the one must necessarily cost more than the other per pound, simply because you have to sustain life four weeks longer in one case than in the other, and that cannot be done for nothing. That is why, though I can easily grow a pound of duck for six cents, I must have eight cents to grow a pound of chicken, because the ducks will take on six pounds of flesh in ten weeks, while the chicken requires twenty weeks to obtain the same size. These appear trivial matters when a person grows only a few dozen fowls yearly, but when he makes a life business of it and grows fowls by the thousands, it is of the utmost importance.

First-Class Breeding Stock

The above shows the necessity of first-class breeding stock to start with. I do not mean fancy stock at all, as many of the points of excellence claimed by the American Standard militate directly against the market value of the birds. A few years ago several men came to buy Pekin ducks for breeding stock. On looking at the birds and getting the price, one man said: "Those are the best birds I ever saw. I want thirty of the best birds you have." Another said: "They are fine birds, but I cannot afford to pay two dollars for a duck; have you no cheaper birds?" "Yes, I have some later birds—culls from which the rest have been selected. They are not as large as these. My late birds never attain the size of the earlier-hatched ones and they will not lay quite as early. You can have your choice of these at one dollar each, which is about their market value."

He took those birds, and I consider when he made that choice that he threw away more than \$100 of his first season's work alone, for, with a fair share of success he might easily expect to raise 100 young birds from each of his breeding ducks, and as the birds he chose were at least one-third lighter than those he rejected, their progeny would not be as heavy at a marketable age by at least one pound per bird. The excess in cost to him, had he bought the better birds, would have been one cent on each of the young birds he raised. He lost, on making the choice he did, more than twenty cents on each bird, and this is not all; those birds will be small for generations to come. He never can get them up to the standard of the others. They will go upon the market as small birds, and as such, command at least two cents per pound less than the larger ones; in fact, his losses in this transaction will represent a large share of the profits.

How to Begin

I will now suppose that the breeder has secured his stock, erected his building, and is ready for business. The next thing is to feed them well, keep them warm and comfortable, giving them as great a variety of green food as is obtainable during the winter months, in order to induce winter laying and insure fertility of the eggs. This matter requires close attention, because the profits in one week of the early market will always equal the profits in four or five of the late. The proportion of the sexes in the early spring should be about one drake to five or six ducks.

One point here I wish to emphasize particularly and that is the selection of drakes. The drakes should, be at

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least, two months older than the ducks, as the latter will mature some two or three months earlier and begin their egg production two or three months before the drakes are ready for breeding. As a consequence, we always selected our February hatched drakes for breeding purposes.

This came a little hard, as those birds averaged to dress seven to nine pounds at ten weeks old and always brought, at least, 30c per pound at that time in the market, making them worth about \$2.50 each. Would-be purchasers thought we were crazy when we charged \$3.00 each for these birds at eight months old, expected us to keep them for six months and coop them for less than fifty cents.

Now this selection of early hatched birds is absolutely necessary for good profits, as early hatched, means early reproduction and these great profits can hardly be ignored. We sold thousands of birds at that time for 30c per pound, having almost complete control of Boston and New York markets for at least six weeks.

Later in the season, when many of the ducks are off duty from a desire to incubate, the proportion should be about one drake to ten ducks. Be particular about this, as the eggs will be much more fertile if a part of the drakes are removed. The feeding boxes should be long and roomy; mine are 6x7 feet long, eight inches wide and three inches high. This is essential, as the birds are rapid eaters, and if there is not room, some will gorge themselves to repletion, while others will get but little. Do not keep food by them, as that will clog their appetites, and always effects the egg production, as well as the condition of the birds.

Keep the Feed Clean

I have often visited poultry establishments where the food was lying around in all conditions,—in troughs, on the ground, trodden upon, mixed with excrement and filth; had become sour and offensive, so that the birds would not eat it. The attendant would go his rounds periodically and throw more food upon the already offensive mass; the owner looking on, passively complaining that his ducks did not lay and his ducklings would not fat.

I required my men to go the rounds after feeding, and if there was any food left, to take it up clean. If this is insisted on they will soon learn to feed just what is required and no more. Clean feeding is of the utmost importance, both for young and old birds, and neither will thrive from overfeeding, as it destroys the appetite completely. Another

essential thing is that ducks will not produce their proper quota of fertile eggs on hard food alone.

The natural food of the duck is principally vegetable and animal, and is obtained in brooks, puddles, swales, and consists of flag, grass roots, small fish, pollywogs, etc. Unlike the hen, the duck has no crop,—the passage or duct leading from the throat to gizzard direct, is very small compared to the size of the bird. Consequently it does not assimilate or thrive on hard food. I was continually receiving letters from amateurs during the months of March and April, complaining that their ducks did not lay, at the same time saying that they gave them all the corn they would eat. I wrote back suggesting soft food, giving ingredients and proportions. In an incredibly short space of time a postal would come to hand saying, "Thanks, my ducks are all laying." Success or failure in the poultry business often date their origin from just such trivial things as the above. So insignificant in themselves as to be entirely overlooked by the novice who, if he is persevering, will eventually discover both cause and remedy; but only through years of costly experiment and a loss of valuable time which he can never recall.

How to Feed Breeding Ducks for Eggs.

There should be quite a distinction between feeding ducks to obtain a supply of eggs and feeding them for market, as in one case the object is to lay on fat and the other is to furnish the most available supply of egg material. As before hinted, soft food is much more readily utilized in a duck's organization than a hen's. We made a habit of turning out our breeding ducks to pasture during the moulting season, housing them in the fall according to the nature of the season, say, from the middle of November to the first of December. We fed soft food morning and evening composed largely of bran with a little meal, keeping them purposely short to induce them to forage for themselves, but when the birds were housed this was all changed.

They were then fed on equal parts of corn meal, wheat-bran and low-grade flour, with about twelve or fifteen per cent. of animal food. One fourth of this food should be composed of vegetables cooked—say, small potatoes, turnips, etc., with all the green rye and refuse cabbage they will eat. We fed this compound morning and evening with a little corn, wheat and oats at noon. Feed all the birds will eat clean and no more. The birds, young and old, may be expected to lay in three weeks from the time they are housed. This part of the thing seems to be under perfect control.

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You turn in the proper variety of food and they cannot help turning out a generous supply of eggs.

The fertility however, cannot, at this season of the year be so perfectly controlled, as the standard of fertility in the first eggs is apt to be very low, but soon comes to a high point. The fecundity of these birds is wonderful. As a general thing each bird can be depended upon for 140 eggs each season, and as the eggs always command from 5 to 10 cents per dozen more than those from hens it makes the Pekin ducks more profitable for eggs alone than any other fowl.

Incubators

With the necessary buildings constructed and the stock selected, the next thing required is the incubator, for I do not suppose the modern poultry grower is going to do his incubating with hens, for the simple reason that he cannot afford to. Hens show no desire to incubate when you want them to the most, or in time to command the high prices for ducks and chicks in the early spring; and this is attended with a loss of at least one-half of the season's profits.

I often had letters filled with questions concerning incubators. Which is the best incubator? Can a person of ordinary intelligence run one successfully? Do they require watching during the night? Is there an incubator in the market today that will hatch as well as the average hen? and many more of like import. To the first I would say that modesty forbade a candid answer. There are objections to many machines, though the same do not apply to all. It does not become me to mention their failings. But first of all do not buy a cheap incubator, as the conditions to which the material of an incubator is exposed are of the severest kind. It must be exposed constantly to a temperature of 103 degrees, and that in an atmosphere surcharged with moisture; and unless the material of which the machine is constructed is of the choicest kind, well kiln-dried and put together, the chances are that it will warp out of shape, admit drafts of air and injure, if not destroy, the regulation.

I do not think an incubator can ever be complete unless it is a double-cased machine. It requires that to effectually resist thermal changes. Years of careful experiment, and of experience in the competitive show room, convinced me of the truth of this. Extreme cold will affect the uniformity of heat in the egg-chamber of single-cased machines. Imagine if you can a single-cased machine constructed of five-eighth inch stuff, with a temperature of 103 degrees inside, and that

of freezing outside. How can the eggs at the extreme corners and the thin cold sides of that machine be as warm as those in the center? Of course that difference does not exist in warm weather, but that is the time when incubators are usually let alone and the business is given up to the old hen. Now, I say this frankly, as much for the benefit of incubator manufacturers as for their customers. I used to have letters every day from parties saying that they had used from one to three machines of different makes, denouncing the machines and their makers in the most emphatic terms as frauds. Now, this was all wrong; one-half of the time you will find that it is the purchasers, not the makers, who are at fault. There are probably just as many honest incubator makers as there are in any other branch of business. But there is such a thing as a man being honest and yet ignorant.

Many of the manufacturers of incubators know very little about the first principles of artificial incubation. They have the idea that a simple heat regulator is all that is necessary to insure the success of an incubator, when in reality it is only one of the many requirements. I will enumerate some of the most essential points, viz.: heat regulation; uniformity of heat in egg-chamber; absolute control of heat by the operator on any given egg-tray; automatic moisture supply; accurate thermometers; thorough construction and good material to avoid warping and shrinkage, together with a safe lamp adjustment.

There are many other minor points which will come up with care of machines. I was often asked, "Why do so many fail to hatch with incubators?" I answered by saying: "Not because it is difficult; for I have always found it a far more difficult thing to grow ducks and chicks successfully after they are hatched, than it is to hatch them." Doubtless everyone knows that an incubator, different from other machines, must run three weeks continually night and day, (and when filled with duck eggs, four weeks), and preserve an even temperature all the while.

Some machines as described above, are not adapted to this business, and some men are not adapted to the use of machines even when they are good ones. They are not willing to bestow the little but intelligent and regular care required, and many times during the four weeks they will forget some of the most-essential points, such as replenishing their lamps, or forget to attach the extinguishers, thus depriving the machine of all self-control, or they neglect to trim the lamps for days, and perhaps a week, allowing the wick

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to crust and the heat to decrease. Others of nervous temperament will open their machines every fifteen minutes during the day and get up many times during the night to do the same thing, necessarily creating a great variation in the temperature of the machine. Now, all these, when repeated often enough, mean disaster and grief. One man who had been very successful, said he liked the hatching very well, but there was too much confinement growing chicks and ducks, and he was not going to make a slave of himself any longer.

Another very young man who was uniformly successful, and was running four large machines, said that the hatching and care of incubators was nothing, as he simply looked at his machines twice per day, but that the care of the chicks and ducks was hard work; but there was more money in it than anything else he could do, and he should stick to it. Another man, because his machine did not run to suit him, threw his boot at it, knocking the regulation all off, which he called upon me to duplicate. (This man has done better since and increased the number of his machines). So the reader will see that there are cranks even among the poultry men, and that many of them enter the poultry business simply because they are looking for an easy job,—a sad mistake on their part. I have always noticed that the man who knows the least, but is willing to acquire knowledge and follow instructions implicitly, is the man who generally succeeds.

Best Place for Incubators

Having secured a good machine, the next thing is to locate it where it will give you the least trouble to run it, and at the same time do you the most good. The best place for this is either in a barn or house cellar or in some building partly under ground, for obvious reasons. Though a good machine can be regulated to run in any temperature (provided it can generate heat enough), yet constant thermal changes of 30 or 40 degrees between night and day will necessitate regulating to meet them,—as the amount of flame required to run a machine in a temperature of 40 degrees, will be far in excess of that needed to run it in one of 70 degrees, for, though the change will be very slow in a nicely packed double cased machine, yet in time even that change will affect.

This, of course, could be easily overcome with a little care, yet it is just as well to avoid all unnecessary care and trouble in the beginning; there will be still enough left to keep you thinking. In a common building above ground during the winter months it will often freeze around your machine, and in turning eggs in a freezing atmosphere do it as quickly

as you can, as it will always cool your eggs perceptibly, and more or less derange the temperature of your machine. This is of course decidedly injurious and will more or less impair the hatch. Now, this is a very important matter, and people do not give it sufficient consideration.

It is even advocated by some incubator manufacturers, that eggs should be cooled every day to 70 degrees, for the simple reason that the old hen does. They do not take into consideration that it is a necessity for the old hen, but may not be for the embryo chick. When the hen leaves her eggs to feed, and they become partially cold, when she recovers them and brings those eggs in immediate contact with the rapidly-pulsating arteries of her body, in fifteen minutes they have acquired their normal heat. With the machine it will require an hour or two.

To meet this difficulty suitable instructions should be given with and to suit different machines. Where the eggs are turned automatically inside the machine, it is necessary that they should be cooled at least once a day during the last two weeks of the hatch. Taking the eggs out to turn twice each day, cools them sufficiently during the winter months; in warm weather, leaving the outside and inside doors open while turning cools them sufficiently.

Some incubator manufacturers will tell you that thermal changes, however great, will not affect their machines. Their patrons tell a different story. No machine was ever made, or ever will be, that will run as well or give as good results amid constant thermal changes as in an even temperature. It is true that they reduce the heat, but it is by admitting large draughts of air, running off the moisture and completely destroying the humidity of atmosphere in their machines. Then, how about those little ducklings which have been pipped forty-eight hours? They can never get out unless you help them.

Suitable Buildings

Many insurance companies object to incubators being run in buildings covered by their policies, and will often cancel them. This originated from the fact that so many fire-traps, which were thrust upon the public in the shape of incubators, had consumed the buildings in which they were operated. The insurance companies were obliged in self-defense to prohibit their use in insured buildings. But the interdiction is usually removed upon the representation that the machine is safe. Sometimes a slight premium is exacted. In the event of insurance companies being obdurate, it is very

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easy to excavate a place in a side hill, or on level ground. Stone it up five feet high at the sides. It is not necessary to dig more than two or three feet deep, as the excavated dirt can be used to bank up with on the outside. Upon this stone-work put a simple roof. I used a building of this description. The original cost, exclusive of labor, was \$15. It was large enough for two machines. My new incubator room was ten times as large, but the cost was in proportion.

This building never froze in winter, and was always some ten or fifteen degrees colder than the outside temperature in summer, making a very handy place to keep eggs for incubating purposes. It is well to run your machine a few days and get the control of it. The next thing is to fill it with fresh fertile eggs. In the winter time, if one does not have eggs himself, this is sometimes a very difficult thing to do, for the eggs must not only be fresh, but fertile. The young beginner is often obliged to depend upon others for his eggs when first starting in the business, but the poulterer, as a rule, cannot afford to do this, because he can grow them a good deal cheaper than he can buy; and not only this, and what is more to the point, he, by proper care and feed during the winter months, can make his own eggs a great deal more fertile than any he can buy of others. Usually about one-third of our novices go right to the stores and purchase eggs to fill their machines with.

This is running a great risk, especially during the summer months, but will give the reader an idea of the amount of knowledge that many of our would-be poultry men have acquired to begin with, and when he knows that the incubator has to shoulder all these mistakes, he will naturally have a little sympathy for the maker. Several years ago I sold a six hundred-egg machine to a lady, who, on receiving it, filled it promptly with eggs obtained from the grocers. Now, as this was in the month of December, it was, to say the least, an exceedingly doubtful operation. As she only got about forty chicks she was naturally very much dissatisfied, and strongly denounced both the machine and the maker. Her husband suggested that possibly the machine was not to blame, and that the eggs might have something to do with it. They went to the grocer to enquire about it. He told them that he had had some of those eggs on hand for several weeks, and that they had been exposed to the cold and freezing weather, and that probably the farmers from whom he had obtained them had held them for high prices.

They found on enquiry that this was the case, and one

party especially, who kept a large number of hens, and from whom he had collected the largest share of his eggs, kept no "crowers" with his hens. This threw some light on the subject, and stock on that incubator went up at once. The next time she had parties save their eggs for her, taking them in several times each day. She then obtained a hatch of ninety per cent, and was uniformly successful afterwards, getting out some 3,000 chicks and ducks during the season with her machine.

How to Keep Eggs for Incubation.

The above is only one case out of many that are constantly taking place. In nine cases out of ten, failure with good machines may be traced directly to the operator or the eggs. Occasionally there is a defect in a machine overlooked by the maker, which he is in honor bound to make good.

The best way to secure good eggs is to engage them beforehand from reliable parties, who will gather them carefully several times each day in cold weather to prevent them chilling, and turn them at least every other day. If these eggs are kept on end it is not necessary to turn them as often.

I kept egg boxes for the purpose, in which the eggs were set on end, like the common market box. These boxes and contents can be turned as readily with a dozen as when full. Eggs intended for incubation should always be kept in a cool place,—duck eggs especially,—as the fertile eggs will change at a temperature of eighty-five to ninety degrees, and spoil within three or four days. One may safely calculate on one-half of them being spoiled in a week at a temperature of 80 degrees. All kinds of eggs can be safely kept three weeks for purposes of incubation, say, at forty-five to fifty degrees, but I always liked to have them as fresh as possible.

In filling orders for eggs at a distance I made it a point never to send eggs more than four days old, or with less than seventy-five per cent of fertility. Transportation, even over rough roads, does not affect their hatching, except in extreme warm weather, when the contents, becoming thin and slightly evaporated through the heat, are apt to mix, when they will surely cloud and rot. I have often sent eggs 2,000 miles, with the report that every egg produced a duckling. With machine ready and running steadily the eggs may be introduced at once. They need no moisture now, and it is not necessary to disturb them for the first forty-eight hours.

How to Choose and Use Thermometers.

Place your thermometer on the eggs in middle of egg-tray. Be sure, in the first place, that you get a good glass, as

all depends upon its accuracy. Do not use one with the mercury bulb lying upon a solid metal plate, as the refraction of heat upon the plate from the tank above will always run that glass one or two degrees higher than the heat in the egg-chamber, but get one, if possible, with a hole in the plate opposite the bulb, so that the heat can play around the bulb and through the plate, giving the correct heat of eggs and chamber. Do not hang your glass up over the eggs, or put it down between the eggs, but lay it on them, for the reason that, though either of these positions may be all right during the first twelve days of the hatch (if your eggs are fertile), they will surely be all wrong during the last part.

I will endeavor to explain this thing, so that the novice will understand how important it is. Before circulation begins in the embryo chick or duck, and there is no animal heat in the egg, the temperature of the egg chamber regulates that of the eggs. But after circulation begins, and especially during the latter part of the hatch, when the rapidly-developing young bird throws out a great deal of heat, the thing is often completely reversed. For instance, a glass may be hung one inch above the eggs and another placed immediately on the eggs beneath. The one above may register 102 degrees; the one below, on the eggs, will register 105 degrees,—conclusively showing that the eggs are now, by their own caloric, heating the egg-chamber.

I have often, during the last part of a hatch, when the thermometer was ranging from 70 to 80 degrees outside of machine, placed a glass on the hottest part of the boiler, where but one lamp was dimly burning, carefully covering the glass. In that position it would register perhaps 96 to 98 degrees, while a glass inside the machine, and on the eggs, would register 103 degrees, proving beyond a doubt that the eggs, by their own caloric, were not only heating the egg-chamber, but contributing their quota towards heating the water in the tank. Now, who will pretend to say that a glass hanging above the eggs will give the correct heat of the egg after circulation begins. So that, even in cold weather, the amount of oil consumed during the last week of the hatch is less than half the amount required during the first part.

The operator must not expect the eggs to heat up at once. On the contrary, they will cool the air in the egg-chamber very sensibly, though they will not affect the heat of the water in the tank. It will be from five to eight hours before they arrive at their normal heat.

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How to Turn Eggs.

At the end of forty-eight hours they may be turned. This should be done by gathering up the eggs at the end of egg-tray and placing them upon the eggs in centre of the tray, rolling the centre ones back to the end of the tray. The tray should be reversed, and the same thing done to the other end. It is not necessary that the eggs should be completely reversed,—simply change the position, rolling over one-half or one-third.

The egg-trays should always be turned end for end, and changed from end to centre of machine. This is necessary in case there should not be a uniform heat in egg-chamber, as it will equalize matters, and, in a measure, obviate the difficulty. Now, all this, though it takes some time to describe it, can be done very quickly, requiring only a few moments for each machine. I usually allow about ten minutes for each 1,000 eggs, though it can be done much quicker if one is in a hurry. I was often requested by people to put in patent automatic egg-turning trays in my machines, it would so simplify matters. I replied:

“So it would; and when you can produce a machine with a perfect uniformity of heat in the egg-chamber, I should be most happy to use an automatic tray, but I have never yet seen that machine.” In our own doublecased Monarch, in cold weather was at least one degree difference between the end and centre of egg-tray. In single-cased machines this difference must be largely increased, and in automatic trays the eggs must necessarily remain where they are placed through the entire hatch. Now, under these conditions, if the heat is right in the centre of trays, it must be all wrong in the ends. The hatch will be protracted long after the proper time, and if those on the ends of trays come out at all it will be forty-eight hours behind time and with weakened constitutions, keeping one in constant stir with their sickly plaints. It is needless to say that there is a great mortality among birds of that description, and at the end of ten days they are usually among the things that were.

Hatching the Eggs.

The next thing is testing the eggs. This matter is essential as well as economical, with both hens and incubators. I once knew a man who ran a six hundred-egg machine for three weeks on one fertile egg. The other 599 proved infertile, and he did not know it until they refused to hatch at the end of three weeks—a great waste of oil, but a greater waste of time,—three whole weeks in the best part of the

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season. Another man kept forty hens sitting three weeks with an average of one fertile egg to each bird, when three of them could have done all the hatching just as well, and then, at the end of four days, could have had the rest put upon better eggs.

A great waste of hen power, you will say, with time lost, together with forty dozen eggs, which would have been just as good for table use had they been tested out in four days. It is the general impression among all egg dealers as well as consumers that eggs having been in an incubator for any length of time are worthless for culinary purposes as the one will not handle them or the other consume them if he knows it. The real act of the matter is that the infertile duck egg that has been in a machine three days is a better egg than a fresh one that is fertile, for the simple reason that the one will keep good indefinitely while the other will begin to incubate in a temperature of 85 to 90 degrees.

I was passing through Boston market one day in June when a dealer called me into his stall and said: "I want to show you something." He pointed to a lot of duck eggs, saying: "Those eggs were received here two days ago and a great many of them are already discolored and worthless." I told him that the farmers were not to blame, that he should have kept them in a cool place as a duck egg began to incubate in a temperature of 85 to 90 degrees. "But Mr. Rankin," said he, "I have had thousands of duck eggs of you for years and I never found a poor one in the lot." I was in a dilemma. I could not tell him that every one of those eggs had been through the incubator and passed my own eye; he might have taken my word for it that incubator eggs were the best eggs but it would be a different thing to convince the public and would sooner or later get out and ruin his custom.

If you wish to keep your eggs, simply remove the male bird and the eggs will keep indefinitely. Put them in a cool, moist place where they will not evaporate and you will find them at the end of six months as fresh to the taste and to all appearances as when first laid. I have often tested an infertile egg by allowing it to remain in the incubator through three successive hatches (twelve weeks) at a temperature of 103 degrees and then found the contents completely evaporated and hardened, the shell one third full on breaking and the substance that remained just as sweet as when first placed in the machine,—a sufficient proof that you need no chemicals or lotions of any kind to preserve it as the germ of fer-

tility in an egg is the germ of decay. It often happens in the winter, when eggs are apt to be infertile, that, after testing the contents of four trays, they can be contained in three, when the other can be filled with fresh eggs. Here is where the advantage of adjustable trays comes in. Often the operator running a large machine has not eggs enough to fill it without a part of the eggs becoming very cold, and also losing ten or twelve days of valuable time; with the adjustable tray, eggs can be introduced at any time, and the same heat preserved on all. I usually tested duck eggs at the end of the third day. The fertile germ is then plainly visible, and the eggs can be passed before the light, several at a time.

The novice had better postpone the operation till the fourth day, when he too, will have no trouble in detecting the germ. The same rule will hold good with all white eggs, but dark-brown eggs should not be tested till the sixth or seventh day. This can be done much sooner, but a large machine full cannot be tested in a minute, and the eggs should be far enough advanced so that the operator can take two or three in his hand at once, and passing them before the flame, readily detect the germ. I never used a tester for duck eggs, as a simple flame is sufficient, the egg being translucent.

During the first stages of incubation the germ is very distinct, even at the third day. The clear eggs are reserved for family use or disposed of to bakers. An expert cannot distinguish them from a fresh-laid egg, either in taste or appearance. There is usually a small percentage of the eggs that are slightly fertilized, in which the germ will die during the second or third day. These can be readily detected at the end of the fifth day, and should be taken from the machine, and reserved as food for the young ducklings. Another and potent reason why all infertile eggs, and those with dead chicks in them, should be taken out of the machine, is that after the circulation begins in the egg, especially during the last part of the hatch, the temperature of a live egg is several degrees higher than that of a dead one. The one radiates heat, the other absorbs it; so that if the operator is running his machine 102 degrees, with his glass on a dead egg, he may be all unconsciously running it at 104 or 105 degrees on a live one.

I had a letter from a man some time ago stating that his thermometers were developing strange freaks,—that though they registered the same while in water, at 103 degrees, when lying on the eggs a few inches from each other in the machine, they were several degrees apart, and wishing to know

by which he should run, the higher or lower. I wrote him that his glasses were all right, and that he was the one at fault, and had he followed instructions and tested his eggs he would have had no such trouble. He wrote that as his machine was not quite full, and as he had plenty of room, he neglected to test them, thinking it would make no difference.

I do not propose here to give my experience, together with the many experiments made during the past years, but shall aim to give the reader simple instructions for hatching and growing ducks for market and selection of breeding stock. I would say here that the first thing for the operator to learn in turning the eggs is to do it carefully and well, without breaking or unnecessarily jarring them; and then, to do it as quickly as possible, especially if done in a cold atmosphere, so as not to derange the heat in the egg-chamber. The next thing is to maintain as even a temperature as possible during the hatch. I do not think that a variation of one degree is at all detrimental. But different people have different ideas of regularity. A man who did not have a first-class hatch, wrote me that he had kept the machine right to business, as it had run between 90 and 110 degrees during the entire hatch. Another man wrote that his machine had been as low as 100 degrees, and once up to 103 degrees, and wishing to know if I thought it would be fatal to his hatch.

There is no such thing as accuracy in the composition of some men, things are run "hap-hazzard," failure and misfortune are always attributed to conditions, circumstances, or hard luck,—never to themselves,—and in case of a poor hatch, always the incubator. Instructions go for nothing with them. An enterprising incubator maker told me one day that he believed that the world was composed of cranks and fools (at least the poultry part of it). The one-half did not know anything, while the other half had all that was worth knowing and despised all instructions and common-sense.

In running your machine, the first step is to set it level and see that the glasses register alike in both ends of the machine. Next, procure good oil, 150 test (as poor oil will necessitate frequent trimming, besides crusting the wick). Do not use more flame than is necessary, as it will only be a waste of oil, and with some machines will increase the ventilation, and at the same time decrease the moisture. Be regular in both filling lamps and trimming them, as irregularity frequently involves forgetfulness, and that sometimes means disaster to the hatch. In trimming, it is well to turn on the

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same amount of flame in relighting your lamp as it had previously.

Keep both lamps and chimneys clean, and have stated periods for turning your eggs, which should be done twice each day. As I said before, an egg-tester is not required with duck eggs, as they are so transparent that the whole process can be plainly seen without in the flame of a common kerosene lamp. If a duck egg is carefully examined, after being subjected to a heat of 102 degrees for twenty-four hours, a small dark spot will be seen about the size of a large pin-head. This little spot, if the egg is gradually turned, will always float over the upper surface of the egg. This is the life germ, and the first indication of fertility in the egg, and is represented in Figure 1.

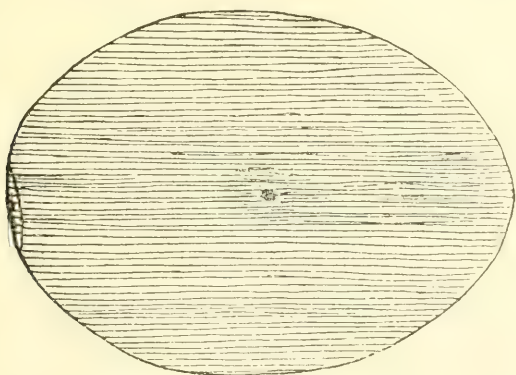


Figure 1.—Showing First Indication of Fertility.

At the end of forty-eight hours this dark spot will have nearly doubled its size, and a faint haze will appear around its edges a shade darker than the surrounding contents of the egg. This haze is the first appearance of the blood veins radiating out from the germ.

Figure 2 shows how the egg appears at this stage with the air-cell slightly enlarged.

At the end of the third day the dark spot, which is the heart of the embryo duck, can still be seen; but not so distinctly, because a dark circle some three-quarters of an inch in diameter will now appear in the upper surface of the egg, in the centre of which the dark spot is visible. This circle is several shades darker than the rest of the egg, and no matter how the egg is turned will always float in its upper surface.

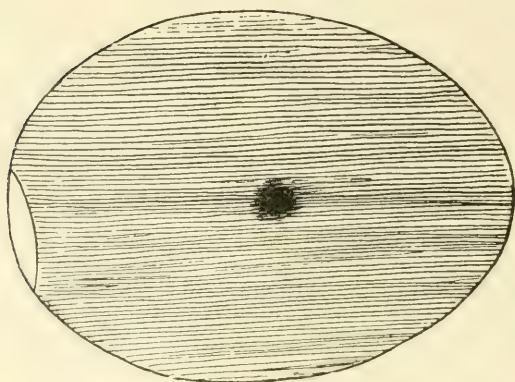


Figure 2.—Egg at End of 48 Hours.

Figure 3 represents the egg at this stage, with its enlarged air-cell.

Figure 4 represents the egg as it appears at the end of the fourth day. The circle surrounding and inclosing the germ will have nearly doubled in size, and is of a still darker hue; indeed, the whole contents of the egg is perceptibly darkened. If the egg is broken carefully at this date a delicate tracery of veins will be found to have enveloped the entire yolk of the egg, all originating from the centre or heart of the embryo; the pulsations of which (if the shell is removed) can now be plainly seen with the naked eye. This net work of veins cannot be plainly seen with a common lamp, but with a powerful glass are very distinct. This latter is not at all necessary in testing the egg.

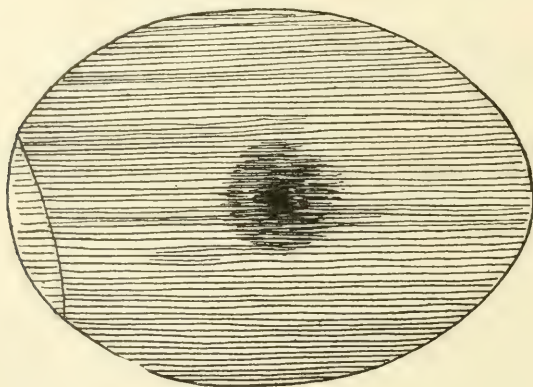


Figure 3.—Egg at End of 72 Hours.

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The discovery and locations of the minute organisms may be interesting to the scientist, but not at all necessary to the operator, who simply wants to be assured of the life and health of the germ. This he can readily determine from the increased size and gradual development of the circle; it, and the contents of the egg, now assume a darker shade. Up to this time use no moisture, and the contents of the eggs have gradually evaporated and the air-cell proportionately enlarged. This air-cell is slightly enlarged till the tenth day, when no further evaporation should take place. About three days before hatching the rapidly developing duck will gradually diminish the size of the air-cell, leaving himself just room enough to work out.

Nature, in the case of the old hen, provides for her own contingencies, while we must resort to art to obtain the same conditions.

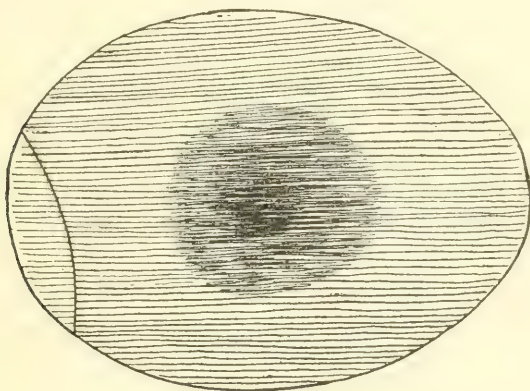


Figure 4.—Egg at End of 96 Hours.

While incubating under the hen during the first few days, the egg evaporates rapidly. Then the pores gradually become coated with an oily secretion from the feathers of the hen until evaporation ceases. Now, we cannot successfully fill the pores of the eggs, it is too delicate an operation to attempt; but we can easily obtain the same conditions in another way, and that is to prevent the further evaporation of the egg by vaporizing water in the egg-chamber, so that evaporation will not take place. Exactly when this should be done is already known, but exactly how much is quite another thing, and depends largely upon the conditions of the atmosphere outside. The point is this: the humidity inside the egg-chamber must be the same, whatever the conditions are outside.

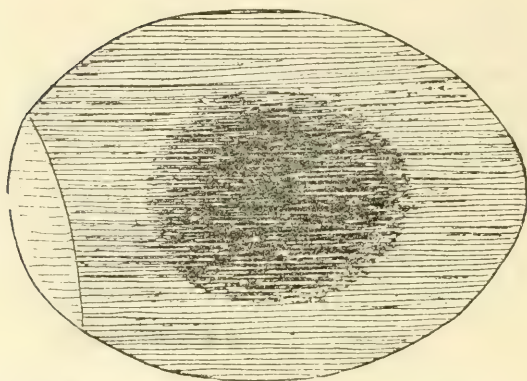


Figure 5.—Egg at End of 120 Hours.

If your machine is in a warm, dry room, heated by a fire, far more evaporating surface will be required than in a cool, dry cellar, for the reason that water vaporizes just in proportion to its heat; and as the circulating pipes upon which the water-pans rest must necessarily be much warmer in a cold room than in a warm one, of course more surface must be exposed in a warm than in a cold one. The operator will always have to use his judgment more or less in that. It may perplex the novice somewhat, but it is easily understood when one becomes accustomed to it.

As a rule, we introduced one moisture pan about the 18th day for both duck's and hen's eggs. It makes some difference whether a machine is run in a humid atmosphere near the sea-

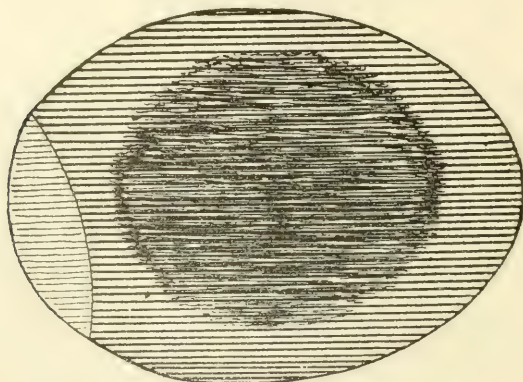


Figure 6.—Egg at End of 144 Hours.

shore or in a dry, rarified atmosphere at an altitude in the country.

Figure 5 represents the egg at the end of the fifth day, the circle enlarged, shaded darker in color; the whole egg being slightly darker in hue.

Figure 6, at the end of the sixth day, shows still more plainly the germ undergoing a gradual change in the egg, enlarging and assuming a darker hue. The outline of the circle is now gradually acquiring the form of an ellipse, and in a live embryo the line of demarkation should be distinct. If it is at all wavy and irregular in its outline, and instead, remaining intact, the contents of this ellipse show a disposition to assimilate with the surrounding liquids when the egg is revolved, it can be safely removed as a dead duck.

Figure 7 represents a dead embryo, as it will appear from the seventh to the twelfth day. The germ being separated

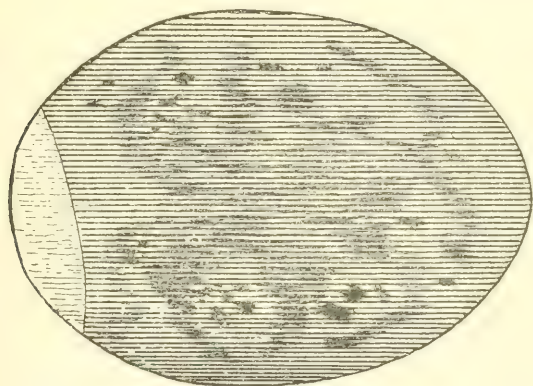


Figure 7.—A Dead Embryo.

and appearing in dark irregular blotches over the entire surface of the egg; the egg having become nearly opaque over its entire surface. At this stage the egg, if it has not already become so, will soon be very offensive. These should be removed at once and handled carefully the while, as they are apt to explode and unpleasant consequences ensue. The operator should run no risks, as discoloration on the outside shell of a duck egg is a sure sign of decay, and they can safely be taken from the machine. There are always a certain number of duck eggs (especially during the month of August and the latter part of July) that have the appearance of fertility during the first three or four days of the hatch, but do not possess vitality enough to carry them through. These die at all stages

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of the hatch; neither operator nor machine is responsible for them. This is caused by the condition of the mother bird.

In order to economize the room thus made by the removal of the fertile eggs, I run a small 150-egg machine, in connection with twenty-one of the largest size, using it, as it were, as a tender. When filling one of the larger machines, I always filled one tray in the smaller one so that when the eggs in the large one were tested, after the third day, there was usually eggs enough in the small tray to replace those removed as infertile, so that the large machines were kept full during the entire hatch by the little one. Thus the small machine was made to accomplish far more than it would had it run through the hatch. I was thus enabled to have a hatch come off nearly every day, consequently our eggs were never older than that when introduced into the machine. Always date each day's quota of eggs—keep them by themselves, then there will be no

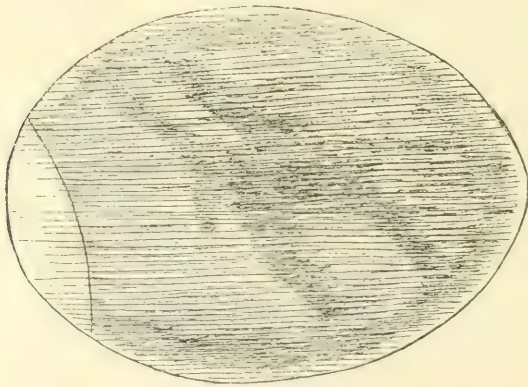


Figure 8.—Egg After 192 Hours.

mistakes made. I have known parties to keep one general receptacle for their eggs, and when filling their machine take them from the top, while the bottom ones were never disturbed, not even turned, and of course soon became worthless for any purpose.

Figure 8 denotes the appearance of the egg during the eighth day of incubation. If portions of the shell are carefully removed at this stage, the rudimentary intestines may be plainly seen, together with the gradual development of the beak and eyes, as well as the trembling of the pulsating arteries through the whole embryo.

At this stage the operator should mark all doubtful eggs and return them to the machine, as he will find plenty of room

there. He will soon become expert, and can detect life and death in the germ at a glance. Experience alone will give the operator an insight into this business. The incipient stages of decay, though easily detected by the expert, cannot be intelligently described by him. The application of a little heat for the short space of twenty days to an inert mass, developing it into active, intelligent life, is simply wonderful. The process and effect he can easily describe, but the procreative power behind it all is beyond his ken. Should a little duckling be taken from the shell on the thirteenth or fourteenth day it will resemble Figure 9. It will kick and struggle several moments after its removal. The yolk is not yet absorbed, but the process is just beginning and will continue until the twenty-fourth day, when it will be nearly absorbed. The egg, from the fourteenth day rapidly assumes a darker hue.

The extremities of the little bird gradually develop, the feathers grow, and at the twentieth day the egg is opaque.



Figure 9.

At this stage the embryo will endure greater extremes of heat or cold than at the earlier stage of the hatch. I should not advise the operator to presume upon this, however, but just make the conditions as favorable as he can, so that the little bird will have the strength to free himself from the shell. I need not say that this is the most critical time during the whole process, and matters should be made as favorable for the little duckling as possible. About the twenty-fourth day he will be already to break the shell, but, unlike the chick, who will make his way out of the shell a few hours after he has pipped, the duckling will lay for forty-eight hours before he is ready to come out. At this time there should be plenty of moisture in the egg-chamber, for should the orifice or broken parts become dry, and the little duckling, in consequence, be attached to the inside lining so that he cannot turn, he can never get out without help.

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When the hatch is well under way a little more air should be allowed to circulate in the egg-chamber, and a part of the evaporating surface can be removed, for as each duckling makes its appearance he becomes a little sponge, until dried off, and furnishes plenty of moisture for the machine. When nearly dried off the duckling should be dropped into the nursery below the egg-trays. While hatching, the eggs should be kept pipped side up in the trays, as the birds sometimes get smothered when the orifice is underneath. The dry birds should be dropped below about once in four hours, for, if allowed to accumulate, they will roll the egg upside down, crowd the egg-shells over the pipped eggs, or pile themselves over the egg, smothering the young birds.

This work should be done very quickly, so as not to derange the temperature of the machine. Be sure to keep the

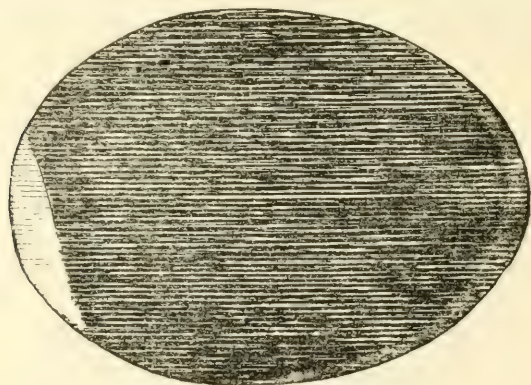


Figure 10.—Egg after 14th Day.

heat up in your machine, for its tendency is always to go down during hatching, for the reason that the egg radiates a great deal of heat, while the little duckling, with its woolly covering (which is a non-conductor), retains it. Many people advocate allowing the little fledglings to remain with the eggs until all are hatched, but this is all wrong, not only for the above reasons, but for one which is far more important than either.

The amount of heat requisite to hatch the eggs is too much for the young birds already hatched and dried off. With chamber at 102 degrees, they will be seen crowding around the sides of the machine with their bills wide open, gasping for breath, when, had they been placed below, the proper temperature can be maintained in both, as the bottom of machine runs at least five degrees lower than the egg-trays.

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Be Sure and Follow Instructions.

Another fertile source of trouble is removing ducklings from machine, putting them behind the stove, or somewhere else to dry off. For every fifteen birds removed, the heat in egg-chamber is reduced at least one degree, as you are removing so many little stoves, and if the machine is not gauged higher, to correspond with the number of ducklings taken out, the result will be fatal to the unhatched eggs.

I corresponded a whole summer with one man on this very point before I found out what he was doing. He said he had never been able to get out more than fifty per cent. of fertile eggs. His machine ran splendidly until his chicks were about half hatched, when it would drop down to 90 degrees, and the rest would die in the shell, after they were nearly all pipped. At last a letter came from him stating that he had just had a worse experience than ever. He had a most promising hatch of three hundred fertile eggs, nearly all of which were pipped, and that, after a little more than half were hatched, he took them out as usual, about one hundred and fifty in number, and put them behind the stove to dry off, and his machine dropped to 90 degrees at once, and not another chick came out. The cat was out of the bag.

I wrote at once that for every fifteen chicks he had taken out he had taken one degree of heat from his machine, and had he followed instructions he would not have suffered loss. He wrote back that he had shut up his machine for the season, but that he should run it one more hatch just to prove that I was wrong. At the end of three weeks a letter was received saying, "I tender you my hat. I got a splendid hatch of 88½ per cent." Proving that occasionally there is danger of the operator knowing too much. After the ducklings are all out, the egg-tray should be removed, the valves opened, and the machine cooled down to 90 degrees, and the birds allowed to remain in the machine for at least twenty-four hours. I always covered the bottom of machine with an inch of fine wheat-bran, otherwise the ducklings would soon make it filthy and offensive. This acts both as absorbent and disinfectant.

After each hatch there will be more or less fertile eggs left in the trays with dead ducklings in them. There will be, comparatively, but few of these in the spring of the year, but during the latter part of the summer there will be more of them, and many of the eggs will have but little vitality in them.

Forcing the Bird Reduces the Vitality of the Egg.

The reason is this: the bird in its natural condition does not produce her eggs in our climate until April. She will lay

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twenty-five to thirty eggs, then show a desire to incubate, then will recuperate and set a second time, perhaps giving a total of thirty-five or forty eggs. Now, we completely reversed nature in this respect. By judicious feeding, good care, warm quarters, and carefully breeding, we induced the bird to produce her eggs in winter instead of summer, and, not only that, we compelled her to lay three or four times as many of them; and when the poor bird showed a desire to incubate and recuperate her exhausted frame, we induced a change of mind, as soon as possible, and set her at it again.

As a natural consequence, as the warm season advances many of the birds are off duty, as it were, and the eggs not only decrease in numbers but in size as well, and during the extreme heat of the summer, the later part of July and August especially, the eggs show a decided want of vitality. I never expected at this season, to realize more than one duckling from two eggs. The same machine full of eggs that would give a hatch of 350 ducklings in the early spring, at this season will not give more than 175 to 200. The eggs appear to be as well fertilized during the first two or three days as in the early spring but evidently there is not vitality enough to carry them through, as the germs soon begin to die, and before the hatch is out you have taken nearly one-half of the eggs away as worthless. Nor is this all.

There is always a far greater mortality among the later hatched birds than in those got out earlier. They are more uneven in appearance, and never attain the size of those hatched earlier in the season,—convincing evidence that the old birds have transmitted their enfeebled, debilitated constitutions through the egg to the young ones. The natural laws of cause and effect are plainly represented here. I tried repeatedly to overcome this difficulty by changing the feed and quarters of the old birds, dividing their numbers, but without effect. This shows the absolute necessity of selecting large, vigorous breeding stock. This principle applies equally to both land and water fowl.

The Absolute Necessity of Good Breeding Stock.

Debilitated, degenerate stock will not produce healthy and vigorous young. This is a prime cause of failure with many of our poultry breeders. They say that they cannot afford to breed from their early-hatched stock. They are worth too much in the market, so they are sent to the shambles, and their owners breed from the later-hatched, inferior birds. A few years' practice of this kind soon degenerates the stock so that you will hardly recognize the original in it, and both birds and

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eggs are not only thus, but a very small per cent. of those eggs can be induced to hatch, and no amount of petting and coaxing can induce those that are hatched to live.

Every young breeder of poultry should inform himself of these facts before he starts in, for no living man can afford to breed from inferior stock. I passed through experiences of this kind many years ago, and always found that the laws of primogeniture cannot be lightly set aside. I invariably select the choicest of my early hatched birds for breeding stock, and no matter how high the price in market, I cannot afford to sell them. A gentleman, who was a large breeder, said to me a few years ago: "How is it that your ducks are so much larger than mine? I bought stock from you four years ago, and have been breeding from it ever since, and now your birds are six or eight pounds per pair heavier than mine." "True, but you bought my latest-hatched birds, because they were cheap, and have been breeding from your latest-hatched birds ever since, while I have been breeding only from the choicest of my early birds. You have been steadily breeding your stock down, while I have been breeding mine up. There is now a wide gap between them."

Caring for the Ducklings When Hatched.

The little ducklings should be left in the machine for at least twenty-four hours longer. Be sure and open the air-valves and give them plenty of air, so that they may be well dried off. A uniform heat of 90 degrees should be held in the egg-chamber. The outer doors of the machine should be closed and the little fellows kept in darkness the first twelve hours. After that the outer doors should be let down. Then you will see some fun, for the little ducklings are far more active than chicks, and will begin to play at once. In the meantime the brooding-house should be prepared for the reception of the young brood. The heat should be started some twenty-four hours previous to use.

The brooding-house should be the same whether you are growing on a small scale or a large one, with simply the length proportioned to your needs. But always recollect that heat should radiate from above on your ducklings, as bottom heat will soon cripple them in the legs and render them helpless. In fact, I do not consider bottom heat as essential even for chicks. The most successful grower I knew of, who grew 3,000 chicks each spring, getting them all out between January 1st and March 1st, and closed up the whole business by July 1st, used top heat exclusively. He experimented fairly with both, and said he wanted no more bottom heat. If the

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breeder is growing on a small scale it will be economy for him to use brooders instead of a heater.

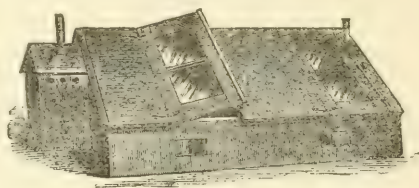


Figure 11.—Brooder.

Figure 11 represents the best duck brooder I know of. As there is no patent on it anyone can make it who has the conveniences. This brooder is six and a half feet long by three feet wide, and will accommodate 150 ducklings. These brooders are of the most improved construction, are intended for both indoor and outdoor work, keeping the young ducks dry and warm in cold, stormy weather, even when located out of doors. The heat is generated in copper boilers, the water flowing through a galvanized iron tank, under which the young ducklings hover. This tank is five feet long, twelve inches wide, and about an inch thick, and is hung about eight inches from ends and back of brooder, leaving nearly eighteen inches in front the entire length of brooder, in which to feed the first day or two. The case of this brooder is made of matched boards and thoroughly ventilated, and furnished with glass doors to admit light. This brooder should be used in the brooding house during winter and early spring, after which it can be used to better advantage out of doors.

Let it be understood that a good brooder is, next to the incubator, the most important thing in the business. It is worse than useless to get out large hatches of strong, healthy birds, only to have them smothered or chilled in worthless brooders. Numbers of the patent brooders now on the market are made by men who never raised a chick or duck in their lives, and are regular fire and death traps. Many instances have come under my personal notice where not only ducks, chicks and brooders, but the buildings themselves have been entirely consumed by these fire traps.

Again, those brooders are always rated far higher than their actual capacity. Ignorant parties buy them, fill them up according to instructions, when a sad mortality is sure to follow from over-crowding and consequent over-heating. This is especially the case with chicks. Ducklings never smother each other from overcrowding, but of course, will not

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thrive when too closely packed. These 150-duck brooders can be run at an expense of two cents per day for oil. In extreme cold weather artificial heat should be kept up in these brooders for three weeks; in warm weather, a week is sufficient. The same brooders can be used over and over as fast as the new hatches come out. When brooders are removed, closed boxes can be used instead.

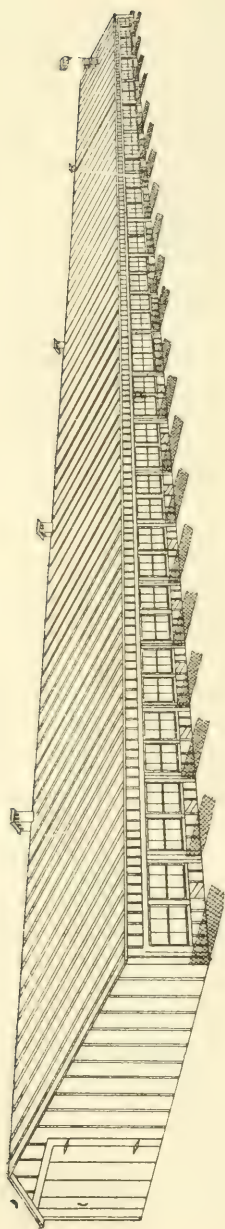
When the operator does business large enough to require the use of five or six brooders, it would be cheaper for him to put in a heater at once, as the original cost of the heater would be less than that of the brooders. Years ago, when the question of heaters was first agitated, the cost was enormous, and the consumption of coal in proportion. Large hot-house boilers were used, often at a cost of several hundred dollars before the thing was ready for use. Now a good heating system can be arranged for a building one hundred feet long at an expense not exceeding \$100. This, of course, would be much less than a complement of brooders for the same building.

Advantages of the Heating System.

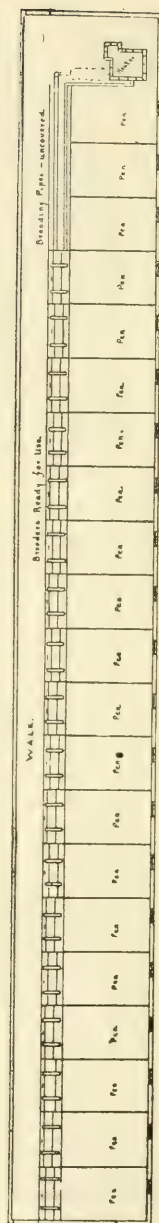
The heating system has several marked advantages over the brooders. One is, that during the extreme cold of winter the building is always warm enough for the little birds, while with nothing but brooders it would often freeze around them, necessitating feeding inside the brooders, which would not be as healthy for the ducklings. Again there would be a great saving of labor, as a self-regulating heater would require no more care than a single brooder, while the oil consumed in the brooders would fully equal the cost of coal required for the heater.

There is one point here which the beginner should always take into consideration in the selection of a heater, and that is, be sure and get one that will give you the greatest amount of heat for the fuel consumed. The patent steam and water heaters now upon the market are too numerous to mention. But there is a vast difference in the economy of these heaters.

When contemplating the purchase of a heater, several years ago, I called upon a party who was running a newly-purchased heater. He seemed very much pleased with it, and said it ran admirably,—warmed his building nicely, and only cost about one dollar per day for coal. I made up my mind then and there that I should run my brooder a while longer. But on interrogating another party using one of a different pattern, he assured me that his heaters warmed both brooders and buildings in good shape at a cost of fifteen cents



Brooding House. (Fig. 12.)



PLAN OF BROODING HOUSE.

(Fig. 13.)

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per day. This was presenting the matter in a new phase. The difference in cost of running these heaters one year would purchase two. I was then running three heaters called the "Bramhall-Deane Heater" and was heating two brooding houses (one 250 feet long, the other 175 feet long), at half the cost per day. Either steam or water may be used. I preferred water for both safety and economy.

For instance, should the fire go out accidentally the heat would cease at once where steam was used, while water would hold its heat for hours, and would continue to circulate just so long as the water in the boiler was hotter than that in the pipes.

Figure 12 represents our brooding-house as it appeared outside. Its dimensions have already been given. It was boarded in with closely-fitting hemlock boards, the whole being covered on the outside with the heaviest quality of "Patent" Roofing.

Interior Arrangement of Brooding-House.

As the construction of this building has been already noticed, I will proceed to describe its interior arrangement for a brooding-house. In the first place, as in the breeding-house, there should be a walk three feet wide the entire length of the building on the back side. Next to the walk, and parallel with it, the brooder box should run. This box will be thirty inches wide, and like the walk, the entire length of the building. In my building the brooding arrangement was very simple, being a box with two sides resting on the ground, eight inches high in the clear, the ground being utilized as the bottom of brooder.

This brooding-box consisted of two parts. The sides, seven inches wide, were nailed securely, and constituted the sides of the pipe-stand. The cover was portable, with cleats nailed across the top to strengthen it, and with strips an inch wide nailed underneath, in front and in back, to keep it in position. These strips were supposed to rest on the seven-inch strips in the sides, and, when the cover is on, make a tight brooder.

Figure 13 represents the interior of brooding-house, with these covers on the brooders and ready for use. Also, with two of the covers removed showing the heating pipes. These consist of a two-inch flow and return, running parallel with each other the entire length of the building, and lying ten inches apart from centre to centre. These pipes rest upon cross boards, whose length corresponds with the width of the brooder, and to which the sides are nailed; two-inch holes are cut

out in the top of these boards into which the pipes are laid, the upper surface of which comes flush with the top of the boards, so that when the cover of brooders is in position it rests equally on pipes and boards.

The distance between these boards corresponds with the width of pens outside of brooder, and constitute partitions for the same. The partitions are simply inch boards, twelve or fourteen inches wide, fitting into ground in front of building to keep them upright and in position. The front of the brooder leading into the pens is cut out in centre of brooder four feet long and four inches deep to allow the free passage of the ducklings. These openings in the first four pens are fringed with woolen cloth, cut up every four inches, to keep the brooder warmer in cold weather. The remaining brooders are not fringed, for reasons which will appear hereafter. The heater can be located in the end of building most convenient to the operator.

The bottom of the pens should consist of sand which, when it becomes wet, and before it becomes offensive, should be covered with fine sawdust. This is a good absorbent and disinfectant as well. The inside of the four brooders next the heater should be filled up with hay chaff to within four inches of the pipes, the distance being gradually increased as you near the other end of the building, until the whole eight inches in height will be required, using simply sawdust enough to disinfect the bottom of brooder. This was my brooding arrangement, with the exception of a common door handle screwed on each brooder cover to facilitate handling. It may not suit every one; some may want it more ornamental, more expensive, others may wish to simplify it still more. But such as it is, it is now all ready for use, with heat applied.

But those little ducklings, who have been waiting all this time in the machine, are getting both hungry and impatient, and require immediate attention. The food which has already been prepared, consists of a formula composed of four parts wheat-bran, one part corn-meal with enough of low grade flour to connect the mass without making it sticky or pasty, in fact, it should be crumbly so that the little birds can eat it readily. About five per cent. of fine, sharp grit should be mixed into their first feed, after that, one or two per cent. is all sufficient. This grit should be increased in size as the birds grow older.

About the third day, a little fine beef-scrap should be introduced, soaking it a little before mixing. When a few days old, a little green rye, if obtainable, should be given them, or

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as a substitute, finely chopped cabbage or lettuce. When the birds are two weeks old, one part corn-meal to three parts bran should be used. This food should be scattered upon the feeding-troughs, which are simply one-half inch boards, nine or ten inches wide, by three or four feet long, with laths nailed on the sides and ends. Small water-cans, inverted in tin saucers, so that the ducklings can drink readily without getting wet, should stand convenient to the food.

How to Remove the Ducklings Without Injury.

To facilitate the removal of ducklings from the machine, I had a square basket some two and one-half feet long, by fifteen inches wide and one foot high, with close covers, hinged in the centre. In order to secure the ducklings, usually all that is necessary is to open one door of machine, hold this basket under it and make a little chuckling noise, and strange to say, the little fellows will run out over the pipes, over the glass door, down into the basket in dozens as fast as their little legs and wings can carry them. This basket will hold 100 ducklings conveniently. When full, it should be carried to the brooding-house and carefully inverted over the feeding-boards.

The little birds will begin eating at once. This process can be repeated until the machine is emptied. There will be some of the later-hatched ones that should be allowed to remain in the machine ten or twelve hours longer, as they can be cared for better there. These can be readily detected, as they are not as active as the others, and perhaps not completely dried off. The ducklings should be put out, if possible, during the middle of the day, and while the sun shines through the windows, as they can be fed in the sun and put under the brooder later in the day.

In event of there being no sun, it will not do to feed under the brooding-box, as it is too dark. Take a one-half inch board, four feet long (to correspond with the length of opening in front of brooder) and six inches wide. Nail two pieces of the same width and height, one foot long, on to each end of this board, forming a parallelogram four feet long and one foot wide, minus one side. This is set up in front of the opening in brooder, and being of the same length, forms a little pen in front of brooder one foot wide, in which the feeding trough can be placed with drinking fount.

The ducklings can then run out and in and feed when they wish. This board will only be needed for a day or two, when it can be taken up and reserved for the next brood. The ducklings should be fed once in two hours, scattering a little food on the troughs. Be sure that they eat clean before more

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is given. At the end of a week the regular feed should be four meals each day.

How to Feed.

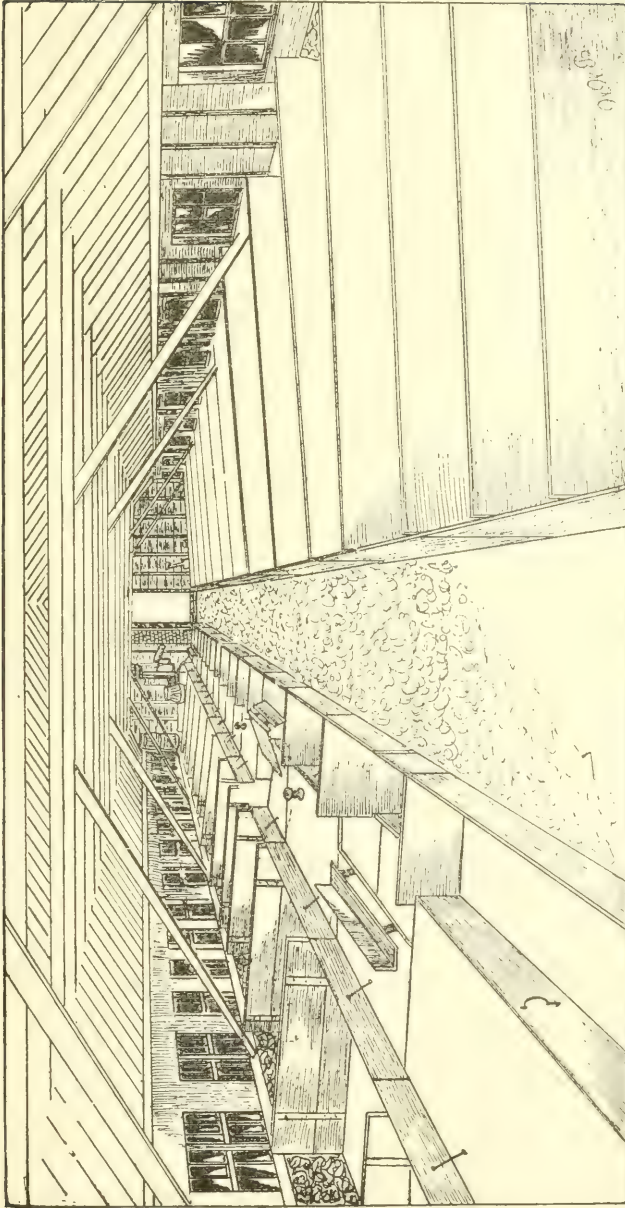
When I could get stale baker's bread I used that in connection with, and instead of, bran. It can be profitably mixed with milk, not too sour, when it can be had for a cent a quart. But do not give milk as drink,—the young birds will smear themselves all over with it, their beaks and eyes will be stuck up, the down will come off their little bodies in large patches, and they will be a constant aggravation. I was once called upon to visit an establishment, the owner of which complained that his ducklings did not grow, and he was very anxious for me to locate the trouble. I found six to eight hundred ducklings there of all ages, and, strange to say, nearly of one size; and one lot of nearly three hundred ducklings eight weeks old would not average one pound each, when they should have weighed four pounds.

Such a sight I never saw before, and hope never to see again. Of all the miserable, squalid, contemptible looking objects, those ducklings took the lead. This man had not only mixed their food with milk, but had kept it by them in open troughs, and the birds had bathed in it and spattered it over each other until there was hardly a feather left on their emaciated bodies; and yet this man did not know what ailed his ducks.

Is it strange that some people fail in the poultry business?

When in full operation we had running twenty-one large machines, and as it requires twenty-seven days to close up each hatch, of course we had a hatch come off nearly every day. Now as each hatch was supposed to occupy two brooder-pens with the corresponding yards, in the course of five or six weeks that brooding house was filled with its complement of 3,000 ducklings. These were of all ages, from the little puff-balls just from the machine, to the half-grown bird of six weeks old. The brooding pipes are supposed to radiate the same amount of heat at the extreme end of the building as they do next the heater, consequently the brooders are of the same temperature in all their parts. Not so the building.

As the heater radiates a great deal of heat, the end in which this is located is always 12 or 15 degrees warmer than the other and is thus better adapted to the comfort of the newly hatched ducklings than the other, so I always put the birds fresh from the machine next the heater, while the older ones were passed down the building. This is a very simple process. One end of the partition board is lifted up a little, food



Inside Plan of Double Brooding House.

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scattered in a trough in the empty pen adjoining, the ducklings will rush under in a moment, then the board is dropped. The same process is continued until all are moved and the building filled.

The building just described we termed our nursery, and had a capacity of about 2,500 birds. When full, the older birds were probably about two weeks old, and of course these older ones must be removed to make room for successive hatches of younger birds. For this purpose, we constructed a building 125 feet long, 32 feet wide, which we styled our double brooding house. It ran east and west with a walk four feet wide through the centre, with brooding-pens on each side. This building had the same capacity of a single building 250 feet long, and accommodated about 5,000 birds. On the south side of this walk our brooder boxes were arranged.

At one end of the building was a heater, from which an inch-and-a-half flow and return pipe ran under the brooder boxes the entire length of the building and furnished heat for the little birds. The brooder-boxes were located twenty inches from the side of the walk. The ducklings were fed and watered in this space, and were not allowed in it except for that purpose. To effect this, the covers of the brooding-boxes, which were six feet long by two feet wide, were cut in the centre length, and hinged with a perpendicular lip, which when closed, met an upright board below, some two inches high, shutting brooders tight, excluding ducklings from feeding apartment, so that it was always sweet and clean.

By this arrangement, the ducklings can all be fed and watered from the walk, thus reducing the labor to a minimum, while there is no danger of crushing the little birds under foot or under the troughs. The attendant is not hampered in his movements, but can work as quickly as he likes. All he has to do is to distribute the food and water, throwing the covers back as he goes, when the ducklings, which are always waiting, rush in and soon fill themselves. Twenty minutes is all that is required for them to eat and drink.

A person of good judgment can easily determine about how much the birds will consume, though it is well for him to pass along the walk, giving a little more food where their wants are not satisfied, or taking up what is left over, shutting the covers down when the birds are through.

As this building was well piped, distributing water at both ends, as well as at the mixing-box and heater, it makes the feeding almost a pastime, the work was done so easily. This building was just what we had been looking for. There

were none on the place that pleased us so well. Its many advantages over a single building must be evident to all. The increased facility for doing the work, as well as its economy in housing many more birds for the money invested, were not the least.

When planning this building, we had some misgiving about running it east and west as the lay of the land required, thinking that the exposure on the north side during the inclement weather of the early spring, would confine the young birds to the building and they would suffer for want of exercise, but we were agreeably disappointed as we found that they thrived equally as well, if not better, on the north side as on the south, proving what I have always known in duck culture, that the extreme heat of summer is more debilitating to young birds than the cold winter, and that early hatched birds will always be of larger size and more robust physique than late ones.

That is why I always made it a point to select my early hatched birds for breeding purposes. I have never known any too good for that. I insert cuts of this double building, with the older ducklings on the north side and the younger ones on the south. Were I to build another, should duplicate it in every respect.

Regulation of Heat in Brooders

Now, as the birds grow larger, they naturally need less heat, and we must contrive to fix it so they do not get so much. As stated before, no fringe is used beyond the first four brooders,—the space in front being left open; and not only that, but we gradually raise the back of the cover next the walk until it opens an inch or more the entire length of the pen. Those ducklings, before they reach the other end of this brooding-house, ought to weigh (if well cared for) over a pound each.

The brooder will not then be large enough to hold them neither do they require the heat, in fact, it would be injurious at this age; so before the birds reach the extreme end of the building shut them off from the brooders entirely by placing a board in front of the opening. The young birds will always thrive better out of doors than in; and when two weeks old always let them out during the sunny days of April, by opening the slides in front.

At this stage of growth when the birds are from two to four weeks old, especially with the early hatches when confined as they usually are during the inclement weather in win-

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ter, unless extreme care is taken, a sad mortality is sure to follow.

There is a great tendency at this stage of growth, when the birds are confined, to overfeed as well as to overheat in the brooders. This, coupled with too little exercise, is sure to cripple the birds, weaken their legs and render them helpless. Even experienced growers sometimes get a little careless and lose whole hatches. We had numerous letters from all parts of the country in which people wrote: "My ducklings are all crippled, cannot walk and are dying off fast. What shall I do?" There is only one thing; feed sparingly, and give all the exercise possible. Often, the want of grit will cause the same trouble.

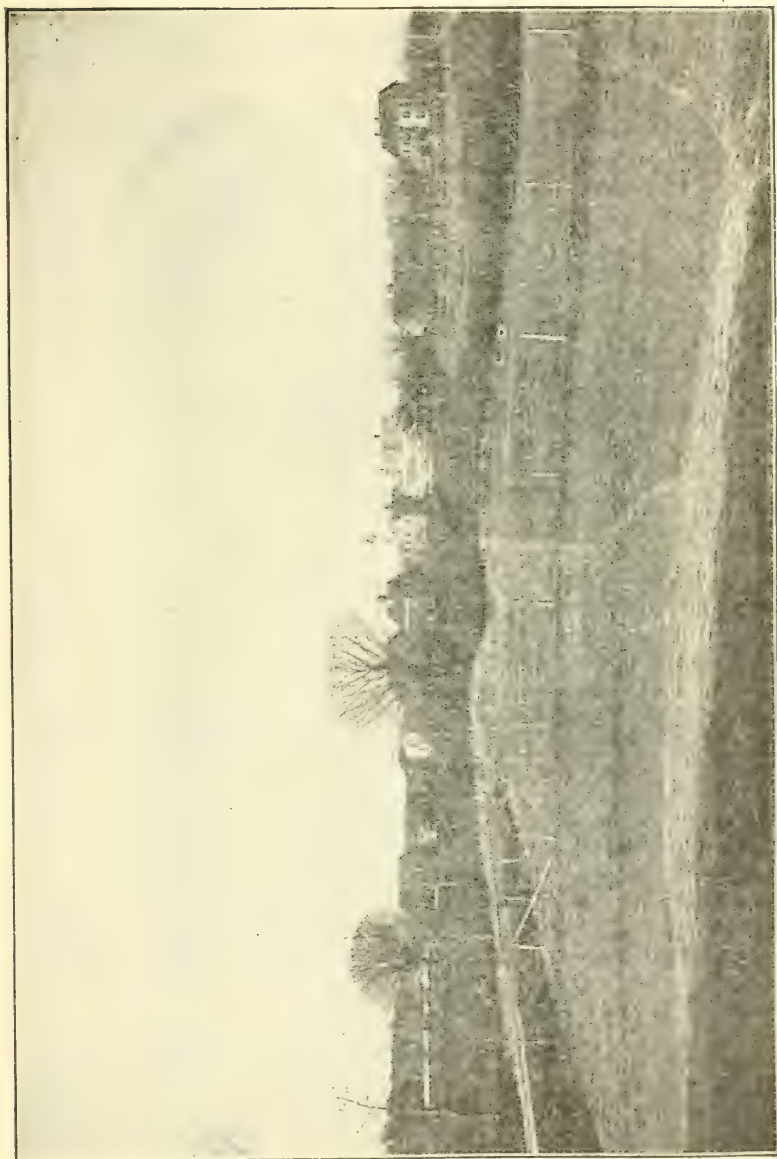
(Our yards were prepared for this the previous autumn, and were covered with a thick coat of green rye five or six inches high). To accomplish this, make pens outside the building in front, ten feet long, and of a width to correspond with the pens inside. Simply use old boards a foot wide, tacking them together with wire nails, as it is only a temporary arrangement. When snow falls it must be shoveled out at once. Just as soon as the weather and the condition of the ground will allow, set up the partition wire outside to correspond with the width of pens inside. This wire partition runs the whole length of the yard; and as the yards are 100 feet deep, it gives the ducklings a yard 6x100 feet. Always feed outside whenever the weather will permit. It is needless to say that the sanitary arrangements in this building are of the utmost importance. Indee, it will require constant watchfulness and care on the part of the attendant.

The Sanitary Arrangements.

With several thousand ducklings confined in one building, the tendency is decidedly filthy. The capacity of the duckling for filth is wonderful, and he comes honestly by it. It is simply astonishing how soon he will manage to mix the contents of his water-tank with that of his yard and make both stoppy and offensive. The chick is nowhere in comparison. It is true, the duck is not so easily affected by it as the chick, but it will not do to presume too much upon that. At this stage the attendant will be kept busy every moment from daylight to dark.

Not only the regular feeding four times a day requires his attention, but the simple mixing of seventy-five to one hundred bushels of feed each day is quite a little job of itself, especially when the different ingredients should be exact. The water tanks also must be regularly cleaned and filled. The

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Birds-Eye View Maplewood Farm. James Rankin, Proprietor

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troughs should be carefully cleaned before feeding, as the ducks will readily eat all foreign matter, together with the food. In short, the whole business must be systematized all the way through, and the attendant should understand that it is never safe to neglect a single detail.

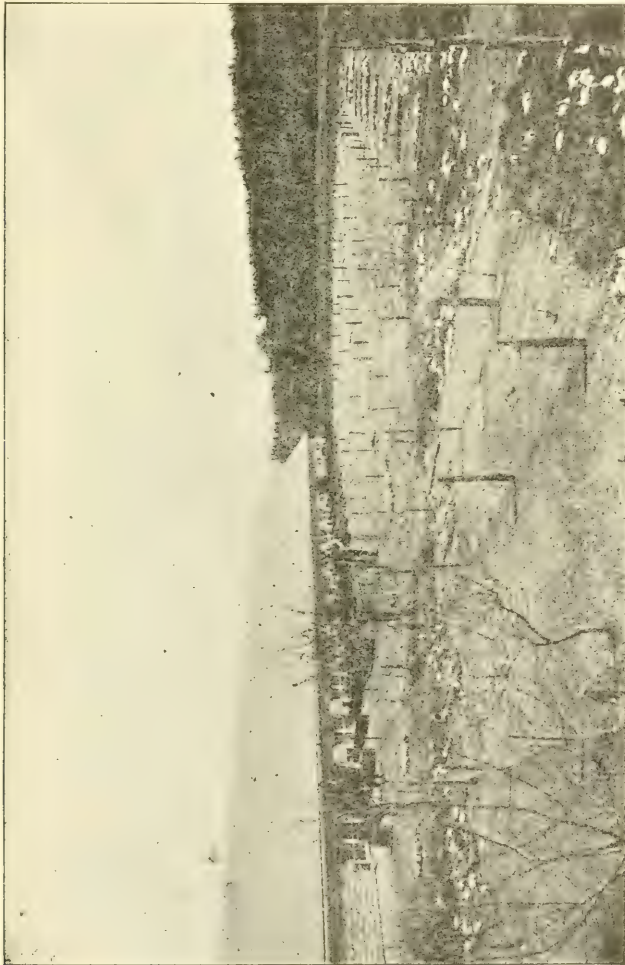
I had always made a point of doing this duty myself. A few years ago, not feeling well and having other business requiring my attention, I engaged a man whom I considered competent to do this business for me. I took him over the yards, showed and told him just how the thing must be done; watched him to see that he did the work faithfully and complied with all its details. Things went on apparently well for a week or two, when, going home one day, I noticed a number of dead ducklings lying around, and looking under the brooder I found quite a number more. I at once interviewed the man and cautioned him. He insisted that he had followed the instructions to the letter. But the mortality did not abate, on the contrary it increased to an alarming extent; and I had lost more ducklings in one month than I had lost for ten years previous.

I watched him and found that the feeding-troughs were not cleaned at all, and when the birds scattered the sawdust in them the food was thrown on that, the ducklings consuming both. The food was thrown partly in the trough and partly on the ground; apparently a matter of perfect indifference to him. The water-tanks were not rinsed out. Instead of stepping over the eighteen-inch partition wires he stepped on them, breaking down the standards and flattening down the wire, so that the birds were all mixed together promiscuously, ducklings two weeks old with those six weeks. The little ones were trodden down by the older ones and almost denuded of their feathers, and there was no thrift to be seen anywhere. To say that I was indignant does not express it. I had often seen such a condition of things elsewhere, but not before on my own ranch; I was absolutely ashamed to show visitors around the yards as long as this state of things existed.

That man was promptly discharged, and I undertook the feeding myself. The birds were sorted out and returned to their own yards the wire replaced, the feeding-troughs cleaned, the pens carefully disinfected. In four days double the amount of food was consumed and things were decidedly improved. But those birds never acquired that uniformity of size and appearance which had always characterized my

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market birds. The best material to use in the pens inside the brooding-house is dry, fine sawdust, if it can be obtained. It is by far the best thing I know of for the purpose. The next best is finely chopped straw or hay, tanbark, etc. The brooders, like the pens, require close attention. The top should



Our Double Brooding House. (South Side.)

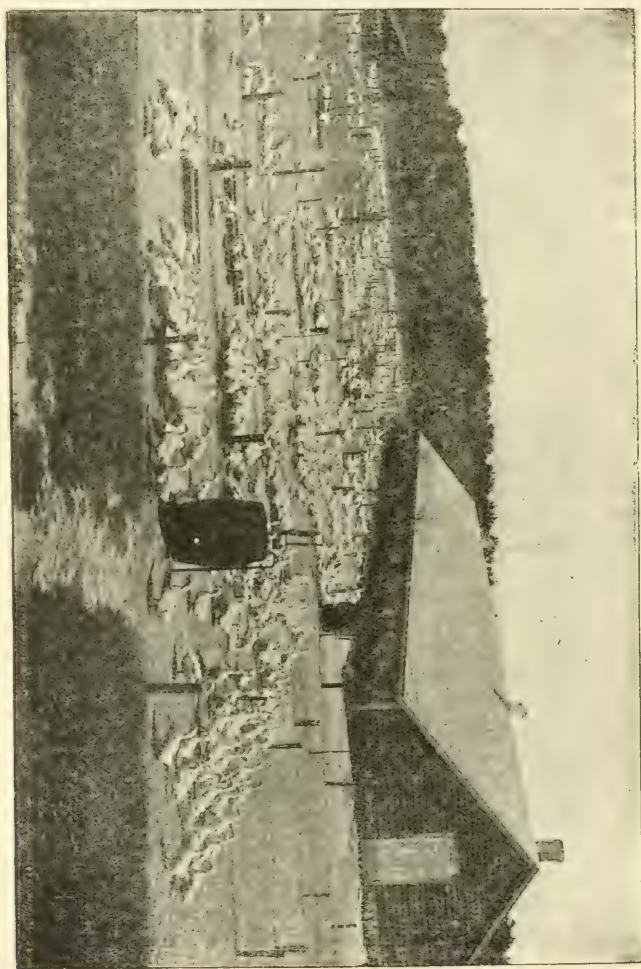
be scraped off before it becomes offensive, and new material applied. This can be easily done by simply lifting the edge of the cover next the walk and drawing it over into the walk, when it can be taken in a barrow or basket.

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The Necessity of Green Food.

It must be remembered that as the broods grow older the cleaning process must be repeated oftener, as their capacity for generating filth will always be in proportion to their size. Those unacquainted with duck-culture have little idea how

Our Double Brooding House. (North side.)



fast these birds will grow; how soon they will successively outgrow brooders, pens and yards, and how soon every vestige of green will disappear from yards that were thickly cov-

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ered with rye. But the ducklings must be kept growing at all hazards, and a vegetable supply must be procured from outside.

Rye comes first in the season (I always cultivate it for the purpose), and when coarse, it must be cut so that it can be readily eaten; then grass; and next corn fodder, which is best of all. It is astonishing how much of the latter these birds will consume—hundreds of pounds each day. It should be cut very fine, not more than one-third of an inch in length. Unlike the hen, the birds prefer the stalk to the leaf. Give them all they will eat, once each day. (But we have forgotten that empty machine. After the ducklings are taken out it will be found running at 85 to 90 degrees. Gauge it up to 102 and fill it with fresh eggs at once, not forgetting to fill one tray in the little tender). There is one bad habit to which ducklings of four to five weeks old are addicted, and that is feather eating. First the down will begin to disappear from their backs; next, as the birds grow older, the quills which grow out from the end of the wings will disappear, and they are all exposed for tempting morsels.

These quills bleed profusely when disturbed, which, of course, seriously retards the growth and progress of the birds. This vice should be checked at once, for vice it is—superinduced by idleness and close confinement. When the first indications of these troubles appear, the attendant should watch the birds closely for a few moments, when the aggressors can soon be detected. They should be removed at once and confined by themselves, or placed in yards with older birds already feathered out, which affords them no temptation to practice their newly acquired art.

If this is not done at once the vice becomes general, and disastrous consequences are sure to follow. If it has already attained headway, before the novice detects it, he must change them to new quarters; a grassy area is best, where they usually forget all about it. This can be readily done, as the operator should always have a spare roll of eighteen-inch wire netting on hand with which he can enclose a given area in a few moments. Too much cannot be said in favor of this wire, it is so cheap, portable and convenient. It can be taken up and removed in an incredibly short time to facilitate plowing and disinfecting the yards. While it effectually separates the birds, it affords little or no impediment to the attendant during the process of watering and feeding. Fasten this wire up to short stakes driven in the ground, using small staples

for the purpose. When removed it can be rolled up, stakes and all, without disturbing the staples.

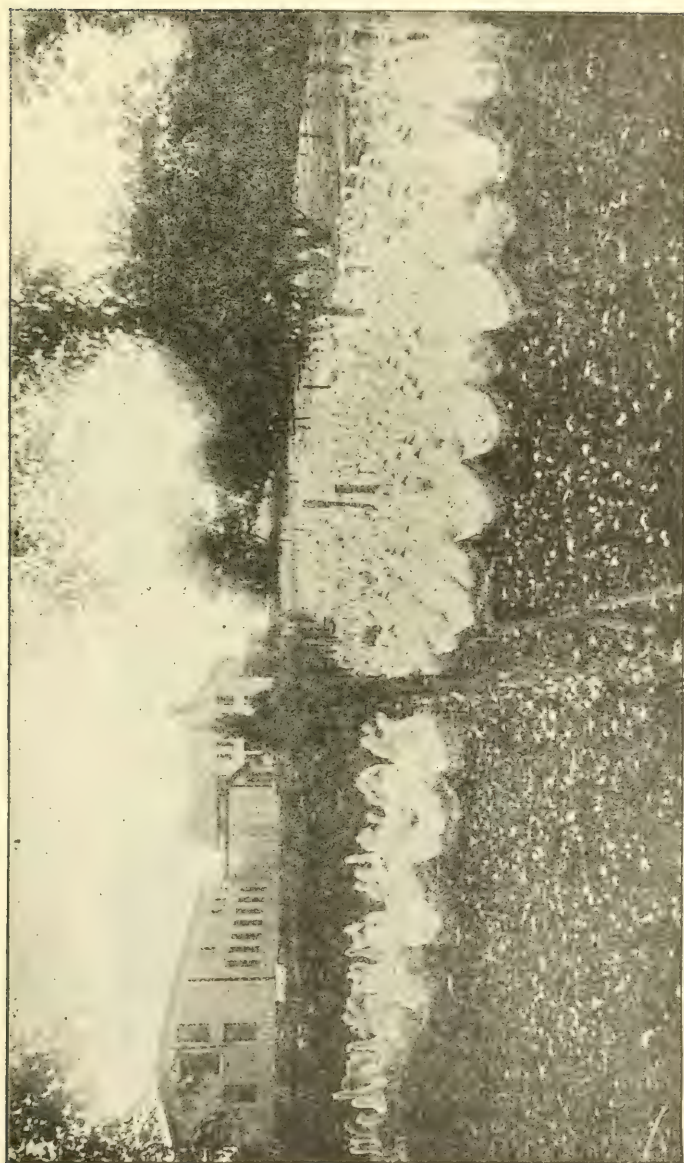
It is then ready for resetting or stowing away for next season's work. This is now the cheapest of all fencing for poultry work,—much more so, even, than lath-fencing; and has the great advantage of being portable and far more durable than any other material. Two-inch mesh, No. 19 wire, can be had for three-quarters cent a square foot by the single roll, and proportionately cheaper by the quantity. Never purchase No. 20 wire, as it will prove unsatisfactory in the end. It is not self-supporting and can only be kept in position by boards, both above and below. There is great difference in the quality of this wire; that made by some firms being of so soft material that it will not stand alone. The squares soon become ellipses, and your eighteen-inch wire settles to a foot.

Previous to this our oldest ducklings will have reached the extreme end of the brooding-house, and it will be filled to its utmost capacity. In order to make room for the successive hatches I drove the older hatches out and round to my cold buildings, two in number. These buildings were each seventy-five feet long, with contiguous yards one hundred feet deep. The slides in the buildings were left open, and the ducklings at liberty to go out or in as they saw fit,—a privilege of which they availed themselves as the state of the atmosphere inclined. These yards always had a thick mat of rye growing on them. The partition wires had been set up and the young birds were quietly driven to their respective quarters.

After ducklings reach the age of six weeks, it is not necessary to confine them in buildings during the night. Indeed, they are far better not, unless it is extremely cold, or there is danger from vermin. Even severe rainstorms will not injure them. They should be watched carefully, however, as they are apt, during their antics, to fall over on their backs, when, through suction from the wet and muddy ground, they are seldom able to turn back again. Prompt assistance should be rendered, or it will surely be too late, as the back of a duckling is his most susceptible part. After the birds are six weeks old it will not be necessary to feed more than three times per day, gradually substituting meal for bran, until the birds are eight weeks old, when their food should be, at least, three-quarters meal. There should also be a steady increase of animal food after the seventh week.

Careful Watering Even More Essential Than Food.

Particular care should be taken at this time to give the



Our Twenty-Five Hundred Breeding Ducks. Kodak standing in centre of yard. Photographed both ways (half view.)

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birds all they need to drink, or your food will be thrown away, as they require more water during the warm weather. They will consume and waste vast quantities, and the water supply should be made as convenient as possible, to facilitate the business. Our water was forced by a windmill into a two hundred-barrel tank, and led from there through pipes into brooding and breeding houses, into the yards and mixing room,—all with a view to saving labor and time. The water-pans in the buildings were raised six or eight inches from the ground to prevent the birds getting in or wasting the water.

At this stage, during warm, dry spells, the dried excrement of the birds will accumulate on the surface of the ground. This, as a matter of economy, as well as a sanitary necessity, should be carefully swept up before a rain, as the birds will sometimes drink water from the puddles standing around, and it will often seriously affect their appetites, as both yards and droppings are very offensive when wet. Shade is absolutely necessary at this age during warm weather, as ducklings can never be made in good condition when exposed to the sun during the extreme heat of summer. It affects their appetites at once, reducing the consumption of food by one-half. It is always well, if possible, to locate your yards so that the birds can have access to shade. If not, artificial shade must be constructed to meet the ends.

My plan was to set up four stakes, about 6x10 feet, forming a parallelogram. Sideboards should be nailed on these stakes about two feet high. These can be covered with old boards, pine boughs, bushes, or thatched over with meadow hay,—whatever is most convenient to the grower. Great care should be taken in feeding by giving all the concentrated food the birds can be made to eat, and no more, as the largest of them will be ready for market when nine weeks old. Frighten and excite the birds as little as possible while sorting them. The best way to do this is to use a wide board some ten feet long, with two holes cut in the upper side near the middle. These holes should be two feet apart, and large enough to admit the hands for convenient handling. Fifteen or twenty of the birds should be driven in a corner and confined with this board. The birds should now be taken by the neck, one at a time, the largest and choicest selected for market, the rejected ones put in a temporary yard by themselves.

This process should be repeated until the whole hatch is sorted, when the culls can be returned to their old quarters. They will have a better chance than before, and in a few days will be good as the others. The oldest hatches, which usually

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come out in February and March, are all sent to market. The price is too high to save for breeders, but from subsequent hatches, those that come out in April and May, we selected our breeding stock.

How to Select Breeding Stock.

Even these birds will command a high price, but I could not afford to wait longer. I was very particular in this selection. The birds must not only be of the largest size, but of the most perfect form. The contour of head and neck, size and shape of bill, length and width of body, all are taken into consideration. As a consequence, not more than one in ten will be found to fill the bill, and my 2,500 breeding birds will be selected from many thousands. The result of all this care and solicitude on my part was extremely gratifying, as it not only gave me the control of the fancy market, but the birds always commanded a higher price in the general market on account of their large size and fattening properties.

As the ducklings are now ready for market, it is necessary that the grower should make some arrangements for disposing of them. He cannot afford to sell them alive to the carts, for though this may be a great convenience to persons who grow a few fowls, the profits which enable these parties to run their collecting carts all over the country, and hire men to pick and dress their fowls, will be quite an item in the pocket of the one who grows on a large scale. The best plan for him is to hire an expert to do his picking for him, and if he cannot get one, to take lessons of one so that he can do it himself. This is a very particular business, as there is a great knack in it. Years ago I thought I knew something about picking ducks, but after watching an expert for thirty minutes I was enabled to double my day's work.

This usually has the same effect upon others. For though it may be weeks before the tyro will be able to do what would be called a fair day's work, yet if he keeps his wits about him, and is endowed with a fair share of energy, there will be constant improvement. I received a letter a short time ago from a lady in Ohio, saying that she was very much interested in growing ducklings, and was satisfied that there was money in it, but that her greatest trouble was in getting them picked, as it cancelled a large share of the profits, and that she hired a woman for the purpose and paid her twenty-five cents apiece for picking; at the same time saying that she could not bear to pay the woman less, as it took her a half day to pick one duck.

I would say here that the duckling should always be put

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upon the market when from nine to twelve weeks old as the large pin feathers will grow profusely, reducing the flesh without increasing the weight of the bird, while the skin becomes loose and full of holes as the pins are shaved off, presenting an unsightly appearance. The market men will always cut the grower on these birds. This is sometimes unavoidable as pickers are scarce, the demand being always in excess of the supply and the birds sometimes grow old on the growers hands.

I would add here a word of caution—I would not advise any one to engage in the duck business unless it was congenial to him and he was physically and mentally adapted to it so that he could enjoy the work, the care and forethought so necessary to success. If he entered the business, disliking the work, the care, and responsibility, simply to make money, he would hardly make a success of it. Again, there is such a thing as a man knowing too much. He has it all down fine before he begins. I have a man of that description who, several years ago undertook to show the rest of us just how to grow ducks. He fed his breeding birds to suit himself and in consequence he got no eggs in time to meet the high spring prices and the eggs did not hatch well. He put his young birds into cold buildings and there was a sad mortality among them. The birds, naturally were small in size and he persisted in keeping them until they were fourteen or fifteen weeks old, when they presented anything but attractive appearance. His pickers remonstrated with him again and again without avail. The birds were cut heavily in market and this with a months extra feed entailed a loss of at least twenty cents per bird. That man threw up the business at the end of the year, declaring that there was no money in the duck business, as he had tried it.

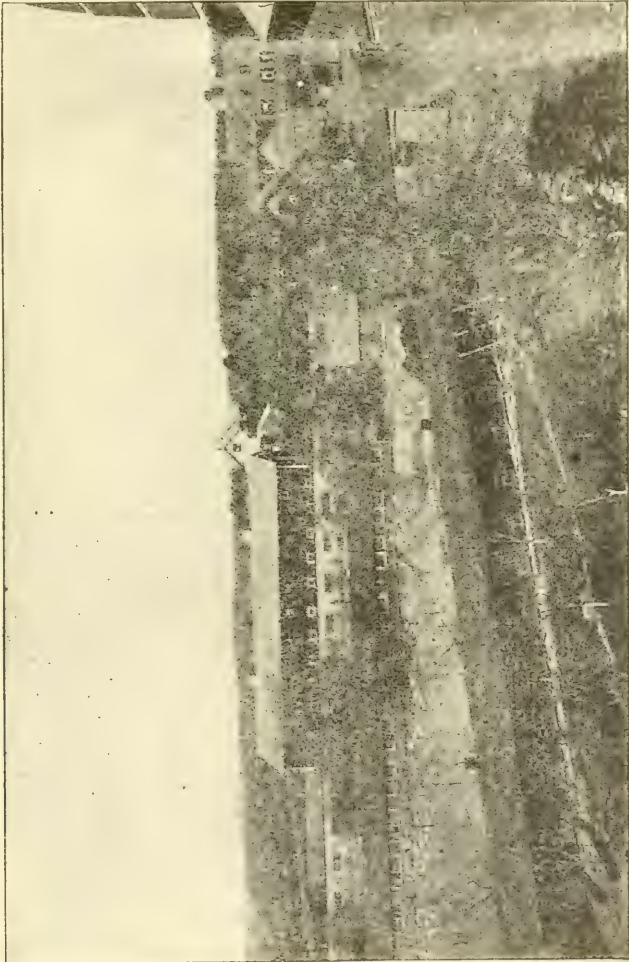
Method of Dressing Ducklings.

A fair day's work for an expert is forty ducks per day, though I have had men who could pick seventy-five and do it well. The process is very simple. All that is necessary is a chair, a box 2x3 feet and 2 feet high for the feathers, a few knives, and a smart man to handle them. One knife should be double-edged and sharp-pointed, for bleeding. The bird should be held between the knees, the bill held open with the left hand, and a cut made across the roof of the mouth just below the eyes. The bird should then be stunned by striking its head against a post, or some hard substance.

The picker seats himself in the chair, with the bird in his lap, its head held firmly between one knee and the box. The

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sooner he gets at it the better, and if he is smart he will have the bird well plucked by the time life is extinct. The feathers should be carefully sorted while picking; the wing and tail-feathers and pins thrown away and the body feathers, with



West Side of Lane.

the down, thrown into the box. Care should be taken about this, as the feathers are no mean source of income, and will always pay for the picking. A dull knife should be used in connection with the thumb in removing the long pins, and, in

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fact, all that can be removed without tearing the skin. The down can usually be rubbed off by slightly moistening the hand and holding the skin tight. As there are often some pins which cannot be taken out without tearing and disfiguring the skin, and some down that will not rub off, they must be shaved off. A knife should be kept for the purpose. This knife should be made of the finest oiltempered steel, and must be sharper than the best razor. The tops of the wings should be left on, and the bird picked half way down the neck. The bird should not be drawn nor the head removed. All this is in reality done in much shorter time than is required to describe it. The expert performs his duties mechanically. The feathers actually seem to stick to his fingers, and he will in seven minutes pick a duck in far better shape than a novice would in an hour. The bird on being picked, should, after the blood is washed carefully from the head, be thrown into a barrel or tank of floating ice. It will harden up so that its rotundity of outline will be preserved.

This method is far better than that practiced by some parties, who pack their birds in ice at once, where the bodies are compressed into all manner of shapes and harden up in that position, and never again can acquire that attractive appearance and rounded outline which a well-fattened duckling should present. After the birds are hardened they should be packed close in light boxes, back down, with the head under the wing, and if your market is within twelve hours ride, can be safely shipped without ice, and they will always arrive in good condition. Dealers like to have them come in this way, they look so much nicer and are far more saleable.

I had boxes for the purpose, of different sizes, holding, when closely packed, twelve, eighteen and thirty-six pairs of birds. These boxes were light, made of five-eighth inch pine, strongly cleated at the corners and ends, and fitted with hinged covers, fastened down with clasps and screws. This is much the best way, as the birds always preserve their shape and arrive in good condition, while express companies return the empty boxes free, and when they "get the hang of it" soon learn to deliver promptly and handle carefully.

How to Ship Poultry.

In shipping poultry, the first thing the young poulterer should do is to establish a reputation among the first-class dealers in his vicinity. This can only be done by shipping first-class stock. Never kill a bird unless it is in good condition. Pick and dress them neatly, box them carefully, and they will always command a good price and a ready sale;

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while equally as good stock, slovenly and carelessly thrown together, will go begging. I have often seen good stock cut several cents per pound, owing to the shipper's carelessness.

A prominent dealer in Boston said to me one day, pointing to a barrel of poultry, "The man who shipped that stuff is a fool! Look here!" He opened the barrel,—it was half full of ducks fairly well fattened and picked. But how those ducks looked. The shipper had evidently thrown those birds in head first, or any way to suit, and then had thrown a lot of ice on the top. The barrel not being very clean, he had introduced blue paper between the ducks and barrel. The ice had melted, the barrel had been capsized during transit, and the paper had been completely disintegrated. It was stuck all over the ducks in little patches and rubbed in, while the birds had acquired a fine tint of blue that would have done credit to a laundryman.

"There," said the dealer, "I shall have to cut that man four cents per pound." If occasionally you should have poor stock always ship it by itself, and notify your dealer of its quality. He will know it soon enough without you telling him, but, at the same time, he will know that you are not trying to put a poor article on him for a good one. One or two pairs of poor birds in a box of good ones will often affect the price of the whole. Never pack a bird till after the animal heat is out. By a close observance of the above, the time will soon come when you will have no trouble in selling your stock. You will have more orders than you will be able to fill.

The last season was a very satisfactory one to us, as we not only largely increased our business, but the prices obtained were better than ever before, while we had been overwhelmed with orders from dealers in New York and Boston which we had been wholly unable to fill.

But to return to the feathers. They should be taken up every day and spread out thinly on a dry floor, turned occasionally, and, in a few days, when thoroughly dry, can be thrown in a heap. Do not neglect this, for if allowed to accumulate they soon become offensive, and nothing but superheated steam will ever deodorize them, and be sure that the feather firms will always take advantage of this and charge you roundly for doing it.

Disinfecting the Ground a Necessity.

When we first began shipping for market, our yards were usually filled to their utmost capacity, and we are often crowded for room. As fast as the yards are emptied, they should

once. By the time these oats are two or three inches high they can be reoccupied by young birds, so that two crops can be grown upon the same ground each season.

My plan was this: I did not heat my brooding-house artificially after the first of June, as the building was always warm enough at that date for ducklings ten days old, without artificial heat. I located some of my large duck-brooders a short distance apart out-of-doors, building a square pen in front of them, 8x12 feet, with boards a foot wide. Into these brooders I put the newly-hatched ducklings as they came out. They need artificial heat the first few days. Of course it would be poor policy to run the heater for the benefit of a few when it would be a decided injury to thousands.

When the ducklings no longer required heat, which would be in a very few days, I removed them at once, either to the brooding-house or to the vacated yards above mentioned, when by that time the oats were high enough to furnish them with green food. The business was managed in this way as long as there were eggs to hatch. I used the eggs for incubating long after I ceased putting them out; for, if there is but one-third fertile, it is more profitable to hatch them than to market them, as the prices on young ducklings after the middle of October usually rule some three or four cents higher per pound than during August and September.

During the spring and summer months, when things were under full headway, there was naturally great care and responsibility. It would not do to make too many mistakes or neglect necessary duties. The young birds had to be fed regularly and given the different prepared foods according to age,—water supplied, grass and corn fodder cut and distributed according to need. Lamps to be trimmed and replenished, eight thousand eggs to be turned twice each day; a new hatch of ducklings coming off nearly every day; the machine to be filled with nicely washed eggs; one to two thousand pounds of ducklings to be dressed and packed for market daily; cleaning and disinfecting yards; entertaining visitors, who flock there by the dozens,—furnished all the occupation we needed. Indeed, were it not for the immense profits attending the business, we might have considered it rather more than we ought to do.

I disinfected my duck yards with rye about Sept. 1. When, in this climate, frost has destroyed all green vegetable life, then rye is in its prime. If sowed September 1, in duck yards, it will attain a height of eighteen inches, and if sowed thickly will crop many tons to the acre. When corn-fodder has gone, we used green clover, then turnip, cabbage and

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green rye in turn and then just before a snow storm we cut a large quantity of the frozen rye and piled it up in the shade, where, of course, it would neither heat or thaw. When we got out of this before the snow was gone, we always had surplus of clover-rowen cured for the purpose.

This, together with refuse cabbage and boiled turnips, small potatoes, etc., makes a fine winter diet on which breeding ducks will always thrive if the other ingredients are properly mixed,—a diet upon which, combined with housing and plenty of exercise, the birds are bound to contribute a good quota of strong fertile eggs. I mention this particularly here, because the mortality among young birds will depend largely upon the strength and vitality of the eggs from which they come.

Natural Duck-Culture.

Doubtless some of my readers are getting impatient and saying to themselves, "Why do you not give us some ideas how to do this business in the natural way? Many of us wish to begin small. Every one has not the conveniences to use or the means to command incubators." I am coming to that. I have a vivid recollection of using hens to incubate with some thirty years ago; and the persistent obstinacy of the perverse birds, the large proportion of valuable eggs spoiled and broken, as well as the time consumed in caring for them, are still fresh in my memory. It was wholesome discipline for me. It will be the same to the reader, and enable him to appreciate a good incubator later on.

A good, quiet hen, who attends closely to her business, will always hatch as large a proportion of her eggs as a good incubator; but there are so many with dispositions quite the opposite of this that it leaves the odds largely in favor of the machine. Success with hens depends quite as much with the operator as with the machines. He must begin right and hold out to the end. As ducks seldom make good incubators, he will have to rely upon hens to do that business for him. The best breeds for that purpose I found to be the Brahma or Plymouth Rock. A cross of these birds makes a good quiet sitter.

The birds must be got out early so that they will begin laying in the fall and be ready to incubate by the time you want them. It is well to have a room for the purpose and have the sitters by themselves. The nests should be in rows around the room, the feeding and water-troughs in the centre, with the dust-bath at one end. The nest boxes should be some fourteen inches square and about a foot high. Each one should be furnished with a slide so that the bird can be

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confined when necessary. If the slide is planned, all the better, as the date of the sitter can then be marked on it. The first thing is to prepare the nests. There is quite a knack in this; indeed, success largely depends upon this one thing.

The best material for this is soft hay or straw, cut six or eight inches long, placed upon a soil bottom. The sides of this nest should be packed hard, the bottom smooth and slightly concaved, not too much, as the tendency then would be to break the eggs if they crowded towards the centre. There should be plenty of room in the nest for the bird's feet and legs and the eggs too, so that she can turn at will without danger of breaking them. A piece of tarred paper five or six inches square, should be placed on the soil in the bottom of the nest; the whole covered with a half inch of finely cut straw. A few porcelain eggs should be placed in the nest, and when a hen shows a strong desire to incubate she should be placed upon the nest and the slide closed, giving the bird all the air she needs.

This removal should be made after dark as the birds are always more gentle then. It is well to set a number of hens at once, if they can be had, for reasons that will shortly appear. If the birds take kindly to the porcelain eggs they can be removed the next evening and replaced with ducks' eggs. As they are much larger than hen's eggs, nine or ten will be enough in cold weather and eleven or twelve in warm; proportioned, of course, something to the size of the bird. I always take the birds from their nests at a certain time every day; they will learn to expect it. This should be done during the warmest part of the day.

Handle Your Hens Carefully.

Now is the time to exercise caution. Take your birds off carefully several at a time. If one should fly in your face, break the eggs and spatter the contents over your person, and you should feel like wringing her neck, don't do it; you would only be so much out. Take things easy, don't get mad; she may do better next time, if not, replace with one that will. When taking your birds off in cold weather cover the eggs at once with a circular piece of heavy paper previously prepared, and they will not cool perceptibly during the fifteen minutes the birds are off. Be sure and return each bird to her own nest, for if you have an uneasy sitter, though she may spoil her own eggs, she should have no opportunity to spoil those of others.

Besides, if you do not, hens that have been sitting but a day or two may be placed upon eggs just ready to hatch when she will not take kindly to the young birds as they

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hatch, and a great mortality is sure to follow. If you should be running 100 sitters, the more you can take off at a time the sooner you will get through. Have a sponge and warm water handy as you will have more or less broken eggs. The rest should be washed clean at once and returned to the nest. When hatching out be sure and remove the little ducklings as fast as they come out, to a warm place to dry off, as owing to their long necks and peculiar shape the mother hen will unconsciously crush many more of them than she would of chicks. In fact, they should never see the hen after being taken away, as they can be grown to much better advantage, and with far less mortality, in brooders.

And just here is the great economy of setting six or eight hens at a time; the young ducklings can be all put together in one brooder and cared for with less trouble and with less mortality than that resulting from one hen with her brood. The ducklings should be confined in yards, the same care and feed given them as already recommended for artificially hatched birds. Allusion has already been made to the proverbial timidity of the Pekin duck. This sometimes causes trouble to the grower when the birds are confined together in large numbers. When six or eight weeks old, and even after they are full grown, they often get frightened, or galled as it were, in dark nights. Being unable to see, one bird will touch another, he will spring away and come in contact with several more.

In an instant the whole are in the most violent commotion, whirling and treading each other down. It will be a perfect stampede and will sometimes be kept up the entire night. After a night of such dissipation many of the birds will appear completely jaded out, and some of them unable to rise. Of course, this must be stopped at once or the grower may bid farewell to all fattening or laying on the part of the birds. Hanging lanterns in the yards at stated distances will usually restore order. It will not be needed when there is a moon. See that there are no sharp projections in either yards or breeding-pens, as both old and young birds are often lamed for life by simply coming in contact with them in the night.

Too much care cannot be exercised on this point, as the bones of the birds are so small and their bodies so frail. As has been intimated before, ducks are not subject to so many diseases as hens,—while they are entirely free from lice or body parasites of any kind. Indeed, I never saw a louse on a duck in all my experience. Still, it cannot be denied that good sanitary conditions, together with plenty of pure air and water, will not only greatly increase the egg-production, but facilitate the growth and improve the properties of the duckling.

Ducklings when confined to yards are sometimes troubled with sore eyes. The adjacent parts become inflamed, the head slightly swelled. This is caused by feeding sloppy food, and from filthy quarters. The feathers around the eyes become filled with the food, the dust adheres to them. The eye is naturally inflamed. Washing out thoroughly and bathing the eye with a little sweet oil will usually effect a cure.

Diarrhoea.

Young ducklings are sometimes afflicted with diarrhoea. This disease is caused more by overheating brooders and the exhausted condition of the mother bird than from improper food. Do not over-feed or overheat the ducklings. Feed bread or cracker crumbs, moistened with boiled milk, into which a little powdered chalk has been dusted.

Abnormal Livers.

This disease is the most dangerous to which young ducks are subject. It is seldom prevalent except during the warm weather, and usually in young birds of from two to six weeks of age. The livers of the young birds enlarge to such an extent as to force up their backs,—a deformity which will cling to them through life. It is caused by a complete stagnation of the digestive organs, and often makes its appearance after a heavy rain, or long wet spell, when the yards are invariably wet, sloppy and offensive. The young birds will, while in constant contact with this mud, absorb more or less of it, clogging the digestive organs, and deranging their appetites. Remove the birds to some dry, shady place, feed sparingly, and give a little of the "Douglas mixture," which may be purchased in any drug store, in the drinking water.

Ducklings Must be Carefully Yarded While Young.

A great mortality often occurs to young ducklings when allowed free range during warm weather, from devouring injurious insects. Bees, wasps, hornets, bugs of all descriptions, are eagerly swallowed alive but not always with impunity, and the birds often pay the penalty with their lives. Always confine them, even when designed for breeding purposes, until they are six weeks old, when they can be allowed their liberty.

The most of the diseases to which ducks and fowls are subject can usually be traced to some infraction of conditions, and of course are always more or less under the control of the careful operator. Two young men called here a short time ago wishing to know what was the trouble with their fowls. Hitherto they had occupied a cold building, so open that the snow sifted through on them, and they had never to their recollection

tion had a diseased fowl. Within a year they had put up a nice, warm building with a glass front, and their fowls had been diseased ever since. They had shut their birds in a building that would run up to 100 degrees during the day and that would go down nearly to zero at night, subjecting their fowls to thermal changes, under which neither animal or vegetable life could possibly live, and then expect them to thrive.

The amateur poulterer should understand in the beginning that it is far easier to anticipate disease in poultry than to cure it. Where fowls are kept in large numbers, their health and well-being can only be insured by extreme care and cleanliness, together with a free use of disinfectants. Buildings should be kept dry, clean and sweet, and not too warm. The greater the variety of food the better, so long as it is healthy and nutritious; while gravel, sand, shell and granulated charcoal should be kept by them during confinement in winter.

I am often asked by parties, "Why do so many would-be poulterers fail if it is a legitimate business and fairly profitable?" I reply, I am not prepared to concede the point that the proportional number of failures in the poultry business is greater than among other vocations in life. Hundreds of men fail every year in mercantile, manufacturing and brokerage pursuits. People do not decry any legitimate business from this cause, because they know there are hundreds who are not only getting a livelihood, but are amassing fortunes at them. There are hundreds, yes thousands, of farms on the market in New England today, for less than the value of the buildings, because their owners have made failures of them. Do men denounce agriculture? No! Because they know that from time immemorial men have not only secured an honest living, but have gained a competence from tilling the soil. You simply say that it is the men. Why not be equally frank with the poultry business?

They say the whole thing is contrary to nature, and you can't improve upon nature. Can't we? That is just what man is placed upon this sublunary sphere for, and he must begin by improving himself. With the present opportunities for obtaining information, no one has a right to remain ignorant because he begins by making a failure of himself; and when a man has failed in the poultry business or elsewhere, it is simply want of that indomitable pluck, energy, and perseverance, which are the requisites of success everywhere, coupled with a disinclination to sacrifice his comfort and ease, or conform his life to his business requirements.

In fact, I know of no branch of farm industry that affords so promising an outlook for an energetic young man as

the duck industry. There is less capital required in proportion to returns. My own experience, which I will briefly relate proves that to me beyond a doubt.

Nearly forty years ago I started in on a 125 acre farm, and before I had done with it, it was called one of the best farms in Pristol county, Mass. I had a good milk route with eighteen cows to furnish the milk, a good truck and fruit business with three hundred to four hundred fowls, ducks, and hens in about equal numbers. I soon had that farm cutting two hundred tons of hay. I had not been running it many years before I found that the poultry department was doing by far the best work and making the largest returns, and having an eye to the profits, the fruit and truck was dropped out, the milk business followed suit, the cows were sold, the hens were eliminated and nothing but ducks filled the bill.

In the meantime I had invented an incubator, not only to hatch my own eggs but those of my neighbors as well. It not only proved a success at home but went to Australia, New Zealand, South Africa, Europe as well as in our own country. There was a great call for it and it was fairly profitable, but I found that I could make more money by using those machines in hatching my ducks' eggs than by making them, so that both incubators and hens followed the milk business.

I am now more than four score years of age, and have retired from the business, but have endeavored in this little book to impart what little knowledge I possess on this important subject to the reader. If he can learn wisdom by my experience and avoid the errors into which I fell, it is all I ask. The business, as I learned its details, became more profitable each year; while the experience of our last season in the work was highly satisfactory, as the demand was greater than ever before.



FORMULAS FOR FEEDING DUCKS

For Breeding Birds.

(Old and young, during the Fall.)

We turn them out to pasture, when we can, in lots of 200.

Feed three parts wreat-bran; one part low grade flour; one part corn meal; five per cent. of beef-scrap; three per cent. of grit, and all the green feed they will eat, in the shape of

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corn-fodder, cut fine, clover or oat-fodder. Feed this mixture twice a day, all they will eat.

For Laying Birds.

Equal parts of wheat-bran and corn meal; ten per cent. beef-scrap; twenty per cent. of low grade flour; ten per cent. of boiled turnips or potatoes; fifteen per cent. of clover-rowen, green rye or refuse cabbage, chopped fine; three per cent. of grit. Feed twice a day, all they will eat, with a lunch of corn and oats at noon. Keep grit and ground oyster shells constantly by them. We never cook the food for our ducks, but mix it with cold water.

For Feeding at Different Stages of Growth.

The first four days, feed four parts wheat-bran; one part corn-meal; one part low grade flour; five per cent. fine grit. Feed four times a day, what they will eat clean.

When from four days to four weeks old, feed four parts wheat-bran; one part corn-meal; one part low-grade flour; three per cent. fine grit; five per cent. of fine ground beef-scrap, soaked. Finely cut green clover, rye or cabbage. Feed four times a day.

When from four to eight weeks old, feed three parts wheat-bran; one part corn-meal; one part low-grade flour; five per cent. of fine grit; five per cent. of beef-scrap. Mix in green food. One per cent. fine oyster shells. Feed four times a day.

When from six to eight weeks old, feed equal parts corn-meal, wheat-bran and fifteen per cent. low grade flour; ten per cent. of beef-scrap; ten per cent. of green food; three per cent. of grit. Feed three times a day.

When from eight to ten weeks old, feed one-half corn-meal; equal parts of wheat-bran and low grade flour; ten per cent. of beef-scrap; three per cent. of grit. Oyster shells and less green food. Feed three times a day. They should now be ready for market.

Note—The above ingredients should be made into a mash, and should be crumbly, not pasty. Proportions by measure, not weight.

QUESTION BUREAU

QUESTION 1.—Why do my ducks not lay? I feed them all the corn they will eat.

ANSWER.—Ducks will not lay on hard grain alone. They should have a mash composed of equal parts of wheat-bran, corn-meal, and twenty per cent. low grade flour, with about one-quarter green food and vegetables; ten per cent. of beef-scrap, with grit and oyster shells.

QUESTION 2.—My ducklings are weak in the legs, cannot stand, and soon die. What is the matter?

ANSWER.—Your trouble is too highly concentrated food and too much of it. Feed on mash composed largely of wheat-bran, low-grade flour and about fifteen per cent. of corn-meal. Mix in plenty of green food, as green rye, clover, corn-fodder, etc. Ten per cent. of ground beef-scrap, or other animal food; five per cent. of coarse sand. This diet is absolutely necessary to properly develop the bird and form flesh, bone and feathers. Feed sparingly. This is essential, as it invites exercise, which is much needed during close confinement in inclement weather.

QUESTION 3.—My ducklings are troubled with sore eyes and do not seem to thrive, what can I do for them?

ANSWER.—This disease savors of filthy quarters, and yet it is not always attributed to that. Improper assimilation of food through want of grit and other ingredients will have a tendency in the same direction. A gummy secretion exudes from the eyes, hardening up among the feathers around them, seriously retarding the growth and development of the bird. Feed sparingly of light food with plenty of grit, and sprinkle a little ginger in their food. Remove the bird to clean quarters and a few days will usually effect a cure.

QUESTION 4.—I am losing my ducklings from diarrhoea. Have but twenty left out of eighty, and they are not ten days old. Please counsel me.

ANSWER.—This disease may have several causes, though I am convinced that the food has but little to do with it. It may originate through the degenerate condition of the parent bird, and consequently want of vitality in the egg from which the little bird comes out in no shape to live; or from

the extremes of heat and cold to which the eggs have been subjected during the process of incubation; or from the same cause after the little ducklings has been placed in the brooder. I am convinced that with a careful selection of the proper ingredients in feeding the old bird, and a reasonable control of the heat in the incubator and brooder (if they are good ones), there need be but little apprehension from this disease.

QUESTION 5.—My breeding birds have the gapes. They stretch their necks and gape, eat nothing, and die in a few days. Can you diagnose the case and help me?

ANSWER.—This is undoubtedly a lung trouble, for on dissecting the birds, I have always found the lungs not only highly inflamed but nearly gone. For years I had supposed this disease incurable, and incidental to bird and clime, but later experience has convinced me that it is not only largely under control but easily anticipated. First, I never knew a case in summer or early spring, when the birds were not confined to buildings but had free and open range, and only when confined during inclement weather, so that it is more or less a denizen of foul air and filthy quarters.

I would much rather have my breeding houses freeze a little than to have them filled with foetid air, and the birds breathe over and over again the ammonia arising from their own excrements. It is one thing for the birds to be confined over their own ordure, their nostrils but a few inches from it, but quite another with the attendant in the walk with his nose six feet away. He may think his buildings quite clean and free from noxious gases, but could his ducks speak they would tell him a different story. This disease, if taken in the early stages, can usually be cured. Isolate the bird with the first appearance of trouble, in a warm, dry place. Feed on food formula for little ducklings. Mix a little cayenne pepper in the food, a little Douglas Mixture in the drinking water, and a large proportion of the affected birds may be saved. Keep your breeding birds dry and clean when confined.

QUESTION 6.—I turned my ducklings out in a grass plot today and have lost nearly one-third of them. What is the cause?

ANSWER.—This may result from two causes. Ducklings from two to four weeks old are ravenous birds and will devour all manner of insects within their reach, which they do not stop to kill. Bees, wasps, hornets and beetles of all descriptions are acceptable, and the little birds, themselves, often pay the penalty with their lives. Again, at the age, they are extremely sensitive to the heat of the sun, and they must

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have shade. Years ago, we sometimes lost twenty birds out of a hundred in thirty minutes, before we knew the cause.

QUESTION 7.—How many birds should constitute a breeding-yard?

ANSWER.—Twenty-five is enough unless the birds have free range, then fifty may run together with safety.

QUESTION 8.—How shall I proportion the sexes for the best results?

ANSWER.—Five ducks to one drake. Later in the season, six or eight ducks to one drake.

QUESTION 9.—How can I distinguish the sexes?

ANSWER.—It is easy for the expert to detect the sex of the bird when very young. The drake has a longer bill, neck and body, with a more upright carriage. At two months old the duck may be distinguished by her coarse quack, the drake by a fine, rasping noise, and later on by the curled feathers in his tail.

QUESTION 10.—How soon will a young duck begin laying?

ANSWER.—At about five months old, often at four and a half months old. At present, September 1st, we are getting some three dozen eggs per day from our young birds, and we are trying to hold them back all we can by light feeding.

QUESTION 11.—Which will lay first, old or young birds?

ANSWER.—Young birds will usually lay from two to three weeks before the old ones, but as the first eggs of the old birds are usually more fertile than eggs from the young ones, there is very little discrepancy in the result.

QUESTION 12.—How many eggs will a Pekin duck lay in a season?

ANSWER.—About one hundred and forty. Their fecundity is wonderful, excelling that of any other duck. We have birds in some yards with a record of one hundred and sixty-five eggs to each bird.

QUESTION 13.—To what age is it profitable to keep a duck?

ANSWER.—We have kept them till four years old with good results. If not forced they may be kept longer to advantage.

QUESTION 14.—Is there a market for their eggs, and at what price?

ANSWER.—Pekin duck eggs sell readily in market, as they are much larger than the other duck eggs. They command from five to ten cents per dozen more than hen's eggs.

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QUESTION 15.—How much does it cost to keep a duck each season.

ANSWER.—From \$1.75 to \$2.00. They are gross feeders, of bulky food, but the greater number and value of the eggs in market over the average hen, makes the duck more profitable as an egg-producer than the hen.

QUESTION 16.—At what season are the eggs of a duck most fertile?

ANSWER.—During the months of February, March, April and May, though they are usually fertile with us during January, June and even July.

QUESTION 17.—What per cent. of the eggs will usually hatch?

ANSWER.—That depends entirely upon how the mother-bird is cared for and fed. See formula for laying birds.

QUESTION 18.—What is the average loss sustained in growing ducklings?

ANSWER.—Not more than two per cent. with us, but it depends largely upon how the old birds are fed; how the eggs are incubated, and the young birds cared for.

QUESTION 19.—How many birds can be safely kept in one brooder and one yard?

ANSWER.—About one hundred, and as they grow older, unless the yards are of good size, a less number would grow and fat better.

QUESTION 20.—At what age should the young birds be put upon the market?

ANSWER.—When the prices are very high in the early spring market them at about nine weeks old, when they would dress from ten to eleven pounds per pair. Later on, when prices are lower market them at ten to eleven weeks old, when they should dress from twelve to thirteen pounds per pair.

QUESTION 21.—When and how do you select your breeding birds?

ANSWER.—As soon as we can distinguish the quality and merits of the bird, and from our earliest hatches, as they always develop into larger and better birds.

QUESTION 22.—How do you treat the young birds for breeding purposes?

ANSWER.—Turn them out to pasture, and feed lightly on food calculated to develop bone, muscle and feathers.

QUESTION 23.—What shall I do to keep my ducks still in the night, when they make a great noise and commotion? Some of them are broken down and cannot stand.

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ANSWER.—Hang a lantern in their yard. You must keep them still.

QUESTION 24.—Can ducks be shipped safely any distance?

ANSWER.—We ship ducks safely all over the United States, Canada and Europe.

QUESTION 25.—Would you recommend incubator or hens for hatching duck's eggs?

ANSWER.—Incubator, by all means, if hatched in large quantities.

QUESTION 26.—Would you use brooders, if hatched under hens?

ANSWER.—Brooders are better than hens, for two reasons. It is less trouble to care for them. Hens crush large numbers of them when small.

QUESTION 27.—How long can the eggs be kept for hatching?

ANSWER.—They can be kept three weeks, safely, if kept on end, in a cool place, but should prefer them fresher.

QUESTION 28.—Can Pekin ducks be crossed with other breeds profitably?

ANSWER.—From our experience, we can say no. In every case it has required longer time to mature the mongrels, and as the prices decline in the early spring, this is quite an item, besides the introduction of colored feathers injures the appearance of the dressed bird, as well as the quality of the feathers, which is also quite an item.

QUESTION 29.—What is the price of duck's feathers in the market?

ANSWER.—Formerly, white duck feathers commanded fifty cents per pound, but since white feathers have been imported from Russia in such quantities, ours average about forty-five cents per pound.

QUESTION 30.—What makes their wings turn out from their bodies?

ANSWER.—This is often caused by the rapid development of the bird. The resting feathers on the sides under the wings, do not keep pace with the rapid growth of the bird, and the constant efforts of the bird to keep the wings in place, tends to turn the wings outward. We have always noticed that these are invariably the best birds.

QUESTION 31.—Which are the most profitable, ducks or chickens?

ANSWER.—This will depend upon whether the grower is a care-taker, or whether he is careless, lazy or untidy. We

think that ducks will bear more neglect than chicks, but it will not do to presume upon that, as ducks will not thrive in filth more than chicks. We think that the average price of chicks in market is rather higher than that of ducks, but as it costs at least two cents less per pound to produce duck flesh, than that of the chick, there is very little difference.

QUESTION 32.—Where are the best markets for ducks?

ANSWER.—Good markets may be found in all of our large cities, though we think New York and Boston the best. Sometimes, when large shipments produce a glut in the New York markets, the surplus is shipped to Boston, where it may be a cent or two higher. Then in a few days things may be reversed and the exodus be the other way, and as the freight is only one-half cent per pound between the two cities, I have known tons to be shipped at a time.

QUESTION 33.—What would a plant cost, with a capacity of 5,000 ducklings, per day?

ANSWER.—With good machines, and buildings barely practical, \$1,500 (if economically expended) would cover cost, independent of land.

QUESTION 34.—What effect does extremes of heat and cold have upon young ducklings?

ANSWER.—After they are a week old they will stand much more of either than chicks.

QUESTION 35.—Is the flesh of birds artificially grown, as good as that grown in the natural manner?

ANSWER.—Just as good. The quality of the flesh depends entirely upon the care and feed given the birds.

QUESTION 36.—How large should the yards be in which the breeding birds are kept?

ANSWER.—At least one hundred feet long, where the buildings are long, and the width of the pens in which the birds are housed.

QUESTION 37.—Do you think it will pay to grow celery to flavor the flesh of the birds?

ANSWER.—We have never done so, and parties who have grown celery for that purpose, have discontinued it as being unfavorable in the end, as they were not able to obtain increased prices for their product.

QUESTION 38.—What is the best green food for ducks, old and young?

ANSWER.—Green clover, green corn-fodder, rye, oats and clover-rowen cured nicely, with green rye, in winter when ground is bare.

QUESTION 39.—Should Pekin duck eggs be pure white?

ANSWER.—Yes.

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QUESTION 40.—Should a pure bred Pekin have any black feathers?

ANSWER.—No. The feathers should be a creamy white. Dark feathers are a sign of mongrel stock.

QUESTION 41.—Will rain injure young ducklings?

ANSWER.—They are as susceptible to rain as chicks up to three weeks of age, but after that, will endure more, and at eight or ten weeks old, will really enjoy a good rain storm.

QUESTION 42.—How large do Pekin ducks grow?

ANSWER.—We have had drakes to tip the scales at 13 pounds each, though this is somewhat rare. The past season, one of our drakes weighed $9\frac{1}{2}$ pounds, dressed, at 10 weeks old.

QUESTION 43.—What is the weight of Pekin duck eggs?

ANSWER.—In the height of the season, ours weighed about 3 pounds to the dozen.

QUESTION 44.—Is wet, marshy land suitable for ducks?

ANSWER.—Should prefer dry land contiguous to a stream or pond.

QUESTION 45.—How many duck eggs should be placed under one hen?

ANSWER.—From nine to eleven, depending upon the size of the hen.

QUESTION 46.—How long does it require to incubate duck eggs?

ANSWER.—Pekin eggs twenty-seven days. Muscovy eggs thirty-two days, same as geese.

QUESTION 47.—Do Pekin ducks sit well on eggs?

ANSWER.—No. They are unreliable. Hens are better. A good incubator still better.

QUESTION 48.—If you were a young man, with the same experience you have now, would you enter the poultry business?

ANSWER.—I certainly would, for two reasons. First, because it is a congenial occupation to me; second, it is by far the most profitable of any branch of farm industry.

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